THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—39TH YEAR SYDNEY, SATURDAY, SEPTEMBER 6, 1952 No. 10

Table of Contents.

RECENT ADVANCES IN RADIOTHERAPY.[1]

By JOHN MAYO,

Honorary Consulting Radiotherapist, Royal Adelaide Hospital, Adelaide.

IN the brief space of forty minutes it will not be possible to cover the whole field of radiotherapy, nor does a meeting of the British Medical Association seem a suitable occasion for dealing with the minutiæ of technical problems and applications. Rather is it an occasion to indicate with a broad sweep of the brush on the canvas new methods, new problems, and the attempt to answer such problems.

Nevertheless, certain matters will be dealt with somewhat more fully, and I must crave your indulgence for the omission of matters of perhaps equal importance.

It is nearly nineteen years since I last discussed radiotherapy in general before a meeting of this Association, and in that period there have been many changes.

Supervoltage was then in its infancy, being in use at a few hospitals only; now its use is widespread. At our own Royal Adelaide Hospital it is hoped that within two or three years we may have a four million electron volt linear accelerator. In 1933 such voltages were unknown.

The year 1934 saw the publication of the Parker Paterson tables and their formal planned patterns for the use of radium. In the better clinics such patterns were already in use, but the Manchester school probably put them on a firmer foundation.

[1] Read at a meeting of the South Australian Branch of the British Medical Association on May 15, 1952.

In 1937 the international röntgen or *r*, the unit of measurement of X radiation, was extended to include the γ rays of radium also. The calculation of dosage of both types of radiation in *r* was a definite advance; previously such inexact terms as "pastille dose" or "milligramme hours" were used in conjunction with the recording of the other factors employed.

Attempts had been made to express radium dosage in "ergs per cubic centimetre" but had been given up on account of grave inaccuracy. It is strange to note that such a method shows some signs of returning to favour.

Radium beam therapy, or the use of a so-called radium bomb, was employed at a number of clinics in different countries, and considerable use was made of isodose curves, although their accuracy may have left something to be desired.

But enough of reminiscence. The present day sees supervoltage at astronomical figures, and newer machines of ever-increasing complexity keep pouring out as a result of great physical advances. Far surpassing the more conventional high voltage machines and even Van de Graaff generators are cyclotrons, betatrons, synchrotrons, synchrocyclotrons and linear accelerators, while among other adjuncts are such things as Geiger-Müller counters, Turner's probes, Farmer's electrometer and scintillation counters which add to the variety of measuring instruments and in some applications tend to supplant the earlier types of apparatus.

Not all the machines listed are used directly for the treatment of disease, but as a result of the existence of some of them and of atomic piles we have numerous radioactive isotopes, which are of great value for research and of some value for treament. These isotopes disintegrate according to the same laws as do naturally radioactive substances, and their half-life periods vary almost as greatly.

Among the advances that have occurred in the last two decades we have already mentioned the extension of the use of the "röntgen" in the calculation of dosage, the more careful and calculated positioning of radium and the use of supervoltage, at first at a relatively modest figure. To these may be added beam direction for X rays, heavier dosage for both radium and X rays, the use of radioactive isotopes, much higher voltages even up to 20,000,000 volts or more in the betatron, and the introduction of various machines for the careful checking and recording of dosage.

In beginning a survey of the advance in treatment of particular sites or types of disease by radiotherapy, it is difficult to know just where to start. There is no doubt that in this country disease of the skin in one form or another is more frequently treated by this means than is disease of any other organ of the body. In spite of the fact that progress has been made in such treatment, much of it is familiar to all of you, and I shall therefore look elsewhere and begin with the uterus, cancer of which is a frequent and lethal disease.

Uterus.

Various changes have taken place in the radium treatment of carcinoma of the uterine cervix. Among the most famous of the standard techniques which have been used over a considerable period of time are the Stockholm technique, with its divided doses, and the French method, which aims at completion of the radium application in about five days. To this may be added the use of Donaldson's butterfly pessary.

Other methods have been the use of long interstitial radium needles in conjunction with the use of an intrauterine container and Campbell's variant of the butterfly pessary.

Various modifications of these have been designed, notably the Manchester technique, which is an offshoot of the French and is chiefly of interest because it provides for a greater dosage in the case of women with wide pelves, and also because of Margaret Tod's work in connexion with dosage and points of critical impact.

Of recent years attempts have been made to increase the dose given to the parametria by the intracavitary radium. Neary designed a formidable piece of apparatus with very heavy platinum shielding, which divided the rays from the radium in the vagina into two beams which overlapped in the parametrial regions. This gave a much higher dose to this region than is given with more normal methods. It used a considerably greater quantity of radium and the weight of the applicator was so great that it needed to be supported and kept in place by elaborate harness.

With the various methods used radium treatment of this disease has produced a promising percentage of apparent cures. The importance of early treatment is reflected in the five-year survival rate, which at one English clinic is over 79% for stage I and just under 30% for stage III.

A relatively recent help in assessing the probable outcome of irradiation is the serial differential cell count introduced by Glucksmann and Spear. The change in numbers of the various types of cell during and after irradiation is stated to give valuable information on the probable result of such treatment in 97% of cases. It is of interest to note that cases in which poor cell response occurs are alleged to be as unsatisfactory with surgery as with radiation therapy. Here one must also mention the Papanicolaou technique of cell examination.

With regard to the treatment in these cases in Adelaide there have been some changes, but not as far as I know the wide diversity of method that has been used elsewhere. I believe that a combination of intracavitary and interstitial radium therapy was that first used at the Royal Adelaide Hospital, but early in 1934 a change was made to the French technique though with rather low dosage.

With this there has been a considerable salvage of lives, but certain difficulties have been encountered. The French colpostat has been stated to be on occasion difficult to introduce into a narrowed vagina and to be liable to become displaced. With this latter observation I fully concur. One might add that it has been the practice at the hospital to use not an imported colpostat but rather a local variety; unfortunately, however, both have the same failings.

As a result it was decided some time ago to adopt Swanberg's modification where necessary. In this a uterine container is employed, and attached to it resting against the external os is either a cylinder or a flat box also containing radium. In our case these were made of "Perspex" at our workshop.

If the vagina is very narrow the box portion can be used as the sole vaginal source of radium, but in a woman with a wide pelvis a colpostat may be used as well.

At the same time our physicists began to make careful calculations of the dose in each individual case, taking sites A and B as described by Margaret Tod of Manchester as the points of reference, the former being the presumed site of crossing of the ureter and the uterine artery and the latter near the bony pelvic wall, usually described as the site of the obturator gland. Unduly high dosage at point A is thought to carry a serious threat of necrosis, while point B receives a much lower dose because of its distance from the radium source and therefore needs additional irradiation, usually from external X-rays, to deal with possible glandular deposits.

An amount of 8000*r* is regarded as the maximum desirable dosage at point A, and to be effective the dose there should not fall far short of this figure. If the radium treatment has been inadequate or badly placed, it is not easy to atone for such defect with X rays.

Calculations of dosage in each case are made from skiagrams taken with a specially arranged machine soon after the insertion of radium. By employing a shift to produce a double image on the films it is possible to calculate position and dosage.

It has been found that a very considerable increase in milligramme-hour dosage is necessary in women with wide pelves, and over 12,000 milligramme hours have been employed without apparent damage. This fact has been emphasized by the Manchester school and is of the utmost importance. It indicates that a purely standardized dosage will save a smaller number of lives and that truly adequate radium treatment of this disease demands a special department with specially trained medical, physical and nursing staffs, and with full physical resources.

Of late years our workshop at my request has made a stainless steel colpostat of the Finnish type. The bight of this is very long and protrudes from the vulva, and as a result is easily kept in place. I have used no other colpostat since its construction except once when it was already in use. The nursing staff needs some instruction in dealing with this piece of apparatus.

A further useful aid designed by Dr. B. S. Hanson is a colpometer to measure the vaginal width. This is particularly necessary when no check skiagram can be taken. At some oversea clinics a Turner's probe is used after the radium is in place. This can be inserted into the bladder and rectum and will indicate the dosage rate at these different sites, thus showing whether defective placing of the radium calls for repacking. One has been ordered for Adelaide, and in the meantime skiagrams give useful information in this regard.

Intravaginal X-ray therapy has been employed in the treatment of this disease. I have used this in a few cases, but only to reinforce the radium dosage. I am glad to say that all the patients are well, one seven years, one six years and one almost five years after treatment. Perhaps this might be more often used. Before leaving this subject one must make at least a brief reference to radioactive cobalt, Co^{60}, which appears to be a suitable isotope to use in these cases and may tend to displace radium if sufficiently cheap. It has the disadvantage that its half life is only 5·3 years, and so frequent recalculation of quantity is necessary or else reactivation by placing it in an atomic pile every two years or so.

Corpus Uteri.

Carcinoma of the body of the uterus is usually dealt with surgically and radiation treatment reserved for those patients who are too frail or otherwise unsuitable for operation.

The chief advance in connexion with irradiation of such patients has been the method introduced by Heyman, in which the uterine cavity is packed with multiple spaced radium containers of relatively low intensity. He claims a 64·9% five-year survival rate. I have no personal experience of this method but have employed for a number of years the Marie Curie Hospital technique, using cornual applicators as well as the central uterine tube, and with this have some patients alive and well after up to ten years or more. When one considers that the cancer may arise in any part of the endometrium and that the uterus is often enlarged, it can be readily understood that the single central radium source within the uterus is likely

to prove ineffective. At the Mount Vernon Hospital a new intrauterine radium applicator has been designed for these cases of endometrial cancer. It consists of a closely wound narrow helix of stainless steel wire and is loaded with short active elements. Differential loading may be employed.

Vagina.

Recent work suggests that a primary vaginal cancer extends far beyond its apparent limits and that fairly heavy irradiation is necessary with deep X-ray therapy and perhaps with a radium mould as well. With the introduction of supervoltage it is hoped to irradiate all these patients more effectively.

Vulva.

Certain cases of carcinoma of the vulva may be treated radiotherapeutically, and I have a few successful cases, the patients remaining well for up to seven years or more. Nevertheless, I consider that this disease should be dealt with surgically, and I believe that modern surgical methods have considerably more chance of success than has radiotherapy.

Mouth.

With regard to the lips I consider X rays suitable for almost all cases, while for intraoral lesions radium in its various modes of application either alone or in combination with X rays gives a modest proportion of successes. For some cases X rays can be used without other radiation. I still have a predilection for radium beam therapy for treatment of growths in the oropharynx, while the use of the projected radioactive cobalt beam therapy units of the order of 1500 curies or more should have an even more powerful effect. However, the four million electron volt linear accelerator is said to have a more effective output even than this, so that it may become the treatment of choice.

Irradiation of such intensity may be sufficient to deal with metastatic glands in the course of the same treatment as the primary growth, as was shown years ago with radium beam therapy. In the meantime dissection of the glands of the neck for lesions of the tongue and other intraoral sites is desirable. For the lips it is rarely needed. If glands are adherent to the mandible a block removal of glands *plus* the portion of mandible involved is indicated. Some few years ago I published an account of two patients so treated, and they have remained well for more than five years—in one case now nine years. Other similar cases could be reported.

Certain sites such as the posterior wall of the pharynx respond well to interstitial radiation therapy, but carcinoma of the pyriform fossa offers less prospect of cure. It is possible that the linear accelerator may change the outlook for sites such as this and the maxillary antrum.

Larynx.

Relatively few cases of carcinoma of the larynx reach the radiotherapist unless the condition is advanced and beyond operation. Without wishing to stress unduly the possibilities of radiotherapy in the treatment of this disease, I would mention that the work of Coutard, Lederman and Max Cutler shows that an appreciable number of patients can be cured thus. Lederman's work with radium beam therapy is of particular interest.

Most radiotherapists have some successful cases, usually of the so-called intrinsic carcinoma. One man I treated eight years ago—with X rays as his sole treatment—was examined in March of this year and remains well, while another of my patients died from cardiac failure just before five years had elapsed, the larynx remaining well.

Admittedly surgical intervention does give good chances of survival in cases suitable for operation. The less radical operations do not cause much interference with the lives of patients, but laryngectomy is a different matter. Before a patient is robbed of normal speech by the operation of laryngectomy, I think consideration should be given to the alternative of radiotherapy. Years ago Cutler devised a divided method, in which half the X-ray dosage was administered in six days; then there was a delay of fifteen days, after which the patient was examined to see what signs of response were present. If these were minimal treatment was not continued, and the patient was instead subjected to operation; if the response was good irradiation was completed. It seems to me that such a procedure, perhaps used in conjunction with Glucksmann's differential cell count, might continue the high survival rate associated with surgery while allowing removal of the larynx to be avoided in a number of cases. In this, as in other conditions, it is evident that combined wisdom is needed.

Before we leave the subject it may be worth recalling the fact that the subglottic type of tumour is not easily seen with a mirror but will often show up well with a soft tissue skiagram.

Thyroid Gland.

A small proportion of cases of carcinoma of the thyroid gland respond well to irradiation. Thus I can remember one case in which a proved carcinoma was growing with fulminating rapidity and was about to fungate. It regressed completely with X-ray therapy, and six years later there was no sign of recurrence.

Unfortunately this behaviour is far from common. Response appears to depend largely upon the type of cell constituting the growth, and often the histological picture will vary from field to field.

Of recent years radioactive iodine, I^{131}, has been used in the treatment of this disease. This substance gives off both β and γ rays, and if the growth shows a selective absorption of iodine some benefit may be obtained. Unfortunately this high uptake is by no means common, and in its absence the outlook is not hopeful. Even when the uptake is good, the result may be poor. I must confess that our results have not been as promising as one American table which shows seven living out of 30 patients after six years. In fact the few cases tried have given no definite success. Perhaps we have been unable to get the isotope in sufficient quantity.

Neither iodine in any form nor thyroid extract should be administered to patients it is proposed to treat by this method, as this will interfere with the uptake of I^{131}. Should either have been given, this should be stopped and an interval of a month allowed to elapse before the treatment is attempted.

One technique calls for total thyroidectomy followed by the use of radioactive iodine. The reason given for this is that after complete removal of the gland any secondary deposits are thought to take over the thyroid function and as a result absorb the radioactive isotope in high concentration, thus destroying themselves.

Perhaps when larger amounts of I^{131} are available results may improve. Because of the emission of γ rays heavy protection is necessary to safeguard those handling it in transit. I believe that plans were made to carry it in the wings of aeroplanes at a distance from the personnel, thus permitting the use of lighter lead screens. Whether such plans were carried out I do not know.

Apart from thyroid cancer there appears to be a real field for it in the treatment of toxic goitre, as its use is said to produce about 80% of cures, while the administration of small quantities with subsequent checking with a Geiger counter is said to be a better test of thyroid activity than the basal metabolic rate. More recent and much more accurate is the use of a scintillation counter for this purpose. This consists of a crystal, usually of calcium tungstate but sometimes of sodium iodide, linked to a photomultiplier tube, the results being read on a milliammeter. A recording type of this instrument is being constructed. The sensitivity is about a hundred times as great as a Geiger-Müller counter. To give an idea of its convenience it may be stated that the crystal portion has now been developed in a hypodermic needle of reasonable bore, which makes it very useful for exploring tissues containing radioactive isotopes.

With the development of South Australian uranium fields it is by no means a remote possibility that the next decade may see an atomic pile in this State; in fact our Premier, Mr. Playford, has said that the first atomic pile in the southern hemisphere may well be on the shores of Spencer's Gulf. Should this be so it may enable the medical profession to obtain a greater variety of radioactive isotopes including some with lives too short to allow bringing from other countries. This should be of great value for research and perhaps for treatment.

Eyes.

Radiation has usually been regarded as dangerous to the eyes, and there is no doubt that heavy irradiation is apt to be followed sooner or later by cataract, while still higher dosage may cause damage to the cornea and even to the retina. Nevertheless radiation has its uses even for eye conditions.

Certain benign conditions such as spring catarrh and corneal vascularization may be satisfactorily treated by very soft X rays, such as are produced by the low voltage beryllium window X-ray tube, or indeed by β radiation from radon or from radioactive phosphorus. Such radiation is also at times used as an adjunct to surgery in the treatment of pterygia.

Epitheliomata, either squamous or basal-celled, may invade the conjunctiva or occur primarily upon its surface. It is astonishing what heavy irradiation the eye will at times withstand.

Thus one woman who had a rodent ulcer invading the conjunctival surface was given at first 4000r by X rays within a week with the eye partly shielded, and when the lesion did not resolve she was given a dose of 4500r about four months later without any shield. The eye remained well for three years, when a recurrence took place, and the eye was then removed. Cataract had not occurred at this stage, but no doubt it would have appeared later.

Retinoblastoma, a rare disease usually occurring in male infants or very young children, is very radiosensitive and may be treated either by external irradiation, such as from beam therapy or supervoltage, or by radon implant.

I have been associated with the treatment in three such cases; the patients were all boys who had had one eye removed and were brought for radiotherapy when the second eye became involved. All were alive seven years later, and two had good sight. The third patient, treated in Adelaide by large radium moulds, showed residual remnants after this treatment, although the tumour had completely changed its colour. I believe that if no further irradiation had been given, after the first application, very useful vision would have been retained. However, it was urged that the tumour was active and that more treatment was necessary. This was given by a second radium mould and then at the Royal Adelaide Hospital in the form of X rays. He is alive but has an almost opaque cornea some sixteen years later.

Naso-pharynx.

For some years radon applicators have been used in the treatment of hyperplastic lymphoid tissue in the nasopharynx. A considerable amount of success has been achieved by this means, the removal of this surplus tissue often resulting in the reduction in frequency and severity of attacks of *otitis media* and thus bringing about improved hearing. However, in many cases there appears to be some appreciable difficulty in keeping the radon in place. Latterly some hundreds of patients, chiefly children, have been treated with X rays with a gratifying proportion of successes. Dr. R. H. von der Borch tells me that he considers that in 75% of cases treated with radon or X rays, the results are successful though some of the patients may have milder recurrences, while of the 25% in which the results are classed as "failures" very few appear to be as bad as before.

Pituitary Basophilism.

Pituitary basophilism may respond to irradiation of the pituitary gland. There is at least one case at the Royal Adelaide Hospital in which the patient was treated well over five years ago and in which a dramatic success was achieved. In conjunction with the physician in charge I hope to publish an account of this case before long.

Œsophagus.

As has been pointed out by Dr. Hanson, the position with regard to carcinoma of the œsophagus shows signs of improvement. Not only is the surgical attack more successful, but in a few cases the condition has responded to heavy irradiation. Thus Dr. Hanson has at least two patients treated four years or more ago who remain alive and well without trace of disease, while a number of other patients treated by various radiotherapists have shown disappearance of the growth for shorter periods but have ultimately died of the disease. The response of yet other patients has shown wide variation. Nevertheless, as so many cases are beyond surgical intervention it is important to realize that radiotherapy can offer the chance of at least an occasional cure, and in many cases worthwhile palliation.

Growths at the lower end of the œsophagus are usually adenocarcinoma and not amenable to irradiation. Here surgery is likely to be of more benefit. Carcinoma of the squamous-cell type in the middle or upper portion offers some chance of response to radiotherapy.

The usual mode of treatment is by means of X rays directed through multiple ports. High dosage is necessary, and damage to the lungs is possible.

In an endeavour to minimize this damage a rotary method of application has been adopted at certain clinics. The patient is turned slowly as if on a spit, the beam of X rays being aimed all the time at the tumour, which forms the centre of the circle This method is used in the Scandinavian countries, by Trump's group in Boston, at the Royal Northern Hospital, London, and at the Royal Cancer Hospital, Fulham, where the floor itself rotates while the patient is subjected to a beam from a two million volt Van de Graaff generator. In Germany a similar method is used and also a moving X-ray tube which swings in an arc over one aspect of the patient. In all these modes of administration the object is to deliver the maximum permissible dose to the tumour while the overlying tissues receive a lesser dose.

Improved results are claimed, and it is of interest to note that installation of a new Siemens plant ordered by the Board of the Royal Adelaide Hospital is now in progress. This machine can employ one type of rotational method, and its use may be a technical improvement.

Lung.

Carcinoma of the lung, usually bronchogenic but occasionally alveolar, is of high importance and of great interest. Its incidence is increasing, and it now figures high on the list at post-mortem examination of male subjects of internal cancer at the Royal Adelaide Hospital. At Saint Bartholomew's Hospital, London, in the year 1947–1948 it was found in 6·8% of all autopsies, in 33·2% of all cancer autopsies and in 41·7% of all cancer autopsies on male subjects.

Treatment of the condition is undoubtedly surgical while it remains operable. A considerable number of patients are saved by this means, but unfortunately many are beyond such treatment. It is of interest to note that on at least one occasion Mr. Sutherland has asked for preliminary irradiation to make the projected operation of pneumonectomy more practicable. In the case referred to the operation was successfully carried out, and the change in appearance of the growth was said to be striking.

Apart from operation X-ray therapy has been employed with survival of the patient for varying periods of time. At oversea clinics apparent cures have been recorded with this mode of treatment.

I have no such case to report, but one patient under my care, regarded as and ultimately proved to be suffering from a bronchogenic carcinoma, was treated with X rays and lost all symptoms for three and a half years. These then recurred, and he returned to hospital asking for further irradiation. He eventually died of the disease over four and a half years after treatment.

Nitrogen mustard has been employed in the treatment of this disease and has produced alleviation of symptoms and improvement in a number of cases, but heavy irradiation appears to be a more hopeful procedure. Nevertheless, it is fraught with some danger, and there is a definite mortality associated with such treatment.

Skin.

I do not propose to devote much attention to skin lesions in general, but I feel that the melanomata deserve consideration.

There can be little doubt that these tumours are best treated surgically with wide removal of skin and deep fascia. Treatment with R 48, an oral compound of the nitrogen mustard series prepared by Professor Haddow of the Chester Beatty Research Institute, has given dramatic results in one or two cases even in the presence of widespread skin nodules, but it is not available here.

However, although the condition is indeed serious, there are quite a number of cases to show that given adequate surgical treatment, even the presence of metastatic glands does not necessarily predicate death.

One young woman had a mole on the inner side of her calf, which she said had been present all her life. Because she did not like its appearance she had it burned off in August, 1941. Six weeks or so later she noticed a painless lump in her groin. This grew slowly at first, but in the early months of 1942 it increased rapidly in size. When dissected by Mr. Ivan Jose on April 1, 1942, these glands formed a mass about the size of a tennis ball. Histological examination showed large deposits described by the pathologist as melanocarcinoma without melanin. It is interesting to note that her mother died of carcinoma of the breast and that her father was treated at the clinic for cancer of the tongue.

She was referred for post-operative X-ray therapy and when I saw her first she was seven months pregnant. In spite of her condition she was given therapy to the inguinal and iliac area, and in due course an apparently healthy child was born in the first week in July. She has remained well since—the last note I have was made nearly nine years later, and in the interval she has given birth to two more children, also apparently healthy.

Dr. Colin Gurner, senior, had an interesting case in his clinic at the Royal Adelaide Hospital.

A malignant melanoma was incompletely removed from a boy's cheek in the latter part of 1947, and he was then referred to the consultative committee of the radiotherapy clinic. Further wide removal of the affected tissues was suggested, and this was carried out but normal epithelium only was found. Glands were then detected in the pre-auricular region and later in the neck. These were treated with moderately intensive X rays and ceased to be

palpable. In July, 1948, a nodule was removed from the abdominal wall and shown to be a melanomatous deposit. In 1951 a gland, also melanomatous, was removed from the right side of the neck. This side of the neck was then irradiated, and in March, 1952, over four years after his first treatment, there was no palpable recurrence.

It has been shown that melanomata take up about three times as much P^{32} as do normal tissues, and so it has been tried in the treatment of this condition, but without very much success.

One case that I was associated with was that of a young woman with secondary cerebral melanomatous deposits. P^{32} was given in fairly considerable dosage. This did not save her, but I am informed that epileptiform seizures ceased to occur after its administration. I believe that further dosage might have helped, but unfortunately consent for this was withheld.

Breast.

Various changes have taken place in the radiotherapy of the breast for cancer. At first direct antero-posterior fields were used for X radiation of the thorax either before or after operation or both. This produced a number of cases of pulmonary fibrosis, and the X-ray beam was then used in a tangential fashion so as to avoid the lung and deeper tissues. Now the usual practice here is to irradiate the lymphatic drainage areas only with as small fields as are likely to be effective. With this technique high dosage is given. Pre-operative irradiation is rarely used. McWhirter of Edinburgh advocates simple mastectomy and the irradiation of rather large fields; but in Adelaide the usual procedure is the radical operation followed by the type of irradiation described. It must not be forgotten that certain patients are suitable for interstitial radon treatment, and in our experience such patients have often done well.

Much of the controversy about this disease arises from the attempt to compare groups not strictly comparable. It is important to consider both the grade and the stage of the disease. Thus in one series of cases, while 94% of patients with Grade I lesions without glands were alive after five years, only 16% of patients with Grade III lesions with axillary glands remained alive. Even more striking was the fact that patients with Grade I lesions with glands had a better chance of surviving for five years than had those with Grade III lesions without glands.

R. S. Handley has drawn attention to the frequent involvement of lymphatic glands of the internal mammary chain, and in one series of 49 cases he found these glands to be affected in 19. Further, continuing investigation shows these deposits to be present in approximately one-third of the cases. Here then is one of the reasons for concentrating the radiation attack upon the drainage areas.

At other clinics the use of supervoltage or radium beam therapy has been stated to render some cases operable that were previously regarded as inoperable. One Canadian writer reported survival up to nine years without recurrence of patients so treated and then subjected to radical mastectomy. In that country, no doubt, the massive radioactive cobalt beam therapy unit when constructed will be tried out for such conditions.

Bony deposits, including pathological fracture, usually respond for a time. Thus a charwoman with a pathological fracture of her right humerus was able to return to her work for eighteen months when this healed after X-ray therapy. Hormone therapy has its place in treatment, but in this paper it calls for mention only.

Bladder.

Carcinoma of the bladder may be treated in a number of ways, among which are a variety of methods of irradiation:

1. The insertion of radon seeds or needles or radium needles according to pattern.

2. Intensive X-ray therapy.

3. A combination of these methods with each other or with some form of surgery. These are not new nor are the results very successful. More recently other modes of treatment have been employed.

4. The use of a distensible catheter, such as a Foley or a Foley-Alcock, with a radon source in the centre. This gives a more or less spherical figure, and the dose can be calculated for the bladder wall.

5. The use of radioactive sodium in a Miller-Abbott catheter, as some oversea workers have done. This isotope gives off both β and γ rays, and in cases treated by this means results are said to have been promising. On account of the very short life of this isotope—its half life is less than fifteen hours—it will not be possible to use it in Adelaide until there is an atomic pile in Australia.

Reticuloses.

Certain other conditions, such as Hodgkin's disease, lymphosarcoma and leuchæmias of the chronic type, respond to irradiation, X rays being the medium usually employed, although the administration of radioactive phosphorus has also been used. Another mode of treating these diseases is to give nitrogen mustard, usually methyl bis (β chloroethyl) amine, although other mustards such as triethylene melamine have been used. This latter can be given by mouth, but it has the disadvantage that it is more toxic. These compounds are mentioned here because their effects are very similar to those produced by whole body irradiation. Certain other substances, such as aminopterin, have been used in the treatment of leuchæmia in children with a degree of temporary success, but that falls somewhat outside the scope of this paper. In spite of these newer methods, however, irradiation with X rays appears to remain the best treatment of such diseases.

Polycythæmia Rubra Vera.

Polycythæmia rubra vera usually responds well to the use of radioactive phosphorus. The first occasion on which such treatment was used in South Australia was in January, 1948, and the patient improved dramatically. The spleen retreated behind the ribs and the blood picture became normal, and subjectively the patient improved immensely. However, of late her condition has deteriorated, although her blood count has remained fairly normal. Her spleen is very large, and she appears to be going down hill. One point worth noting is that the use of P^{32} in this disease is said to carry a risk of being followed by acute leuchæmia.

Embryoma of the Kidney.

Embryoma of the kidney or Wilms tumour is very radiosensitive. In most of our cases surgical removal of the almost vanished remnant of the tumour has been needed after irradiation with X rays, but in one case it was not possible to find malignant cells in the mass removed. Heavy dosage is needed, and as the patients are small children the procedure is not free from difficulty. I am glad to say that we have some successful results.

Seminoma.

Seminoma is another very responsive tumour. The patients are usually examined after a simple removal of the testis and tumour has been performed. The radical operation advocated by some authorities oversea has rarely if ever been adopted. The surgical procedure is followed by the administration of X rays to an area extending from the scar to the suprasternal notch, sometimes taking in the left supraclavicular fossa as well.

We have a fairly high percentage of survivals for more than five years, being well over 50% for all types of testicular tumour treated. Among these survivors are a number of patients who had pulmonary or abdominal deposits which have vanished with treatment. One young man in Dr. Colin Gurner's clinic presented with cranial and bodily palsies from cerebral deposits. He entered hospital complaining of these symptoms and had not noticed the testicular tumour. This was discovered and removed by simple orchidectomy, and the skull and other appropriate areas were then irradiated. Two and a half years later he now remains apparently well, the palsies having disappeared.

Testicular tumours other than seminoma are considered to respond less well.

Ovary.

Ovarian tumours vary in their degree of sensitivity, some being particularly responsive. No doubt all radiotherapists have patients that have done amazingly well, and among others my thoughts turn to a patient now dead from whom the growth was incompletely removed. After radiotherapy she remained well without apparent recurrence for eight years, and then a metastatic gland appeared in her right supraclavicular fossa. In quite a number of other cases in which the peritoneum was heavily soiled with growth from rupture either before or during operation, the patients remain well after more than five years.

Bony Tumours.

Giant-cell tumours, now usually called osteoclastomata, respond fairly well to irradiation. Of late it has been suggested that the response is better if no preliminary surgery has been employed. Other sensitive growths are reticulum-cell sarcoma of bone and sometimes osteogenic sarcoma.

Most of you, I think, have seen or read of Mr. G. H. Burnell's case of sarcoma of the scapula. The patient was given heavy irradiation, and the mass disappeared. Mr. Burnell then removed the greatly eroded scapula, leaving the arm in place. In spite of a preliminary positive biopsy result no malignant cells could be found in the mass removed. The patient remains well almost four years later.

The advance in treatment of these tumours and, indeed, of other tumours as well, lies very largely in the greatly increased dosage now employed. This, in turn, usually means that better beam direction is necessary and a more careful evaluation of the dose actually received by the tumour and by the adjacent tissues on all sides of the tumour. This demands skilled physical services, a matter to which I shall return later.

Myasthenia Gravis and Thymic Tumours.

I was interested to note that writers in recent articles have indicated that there is a field for radiation treatment in *myasthenia gravis* when there are thymic tumours associated with the disease. This is said to occur in 13% of cases of this disease.

Thirteen cases have been reported from Saint Bartholomew's Hospital, in 12 of which definite tumours were present, and the remaining patient probably had a tumour. Nine patients were treated with surgery and irradiation, and four with irradiation only. The results generally appear to have been good. To give one example, one may cite the case of a woman, aged thirty-seven years, with severe disease and generalized myasthenia. She received irradiation only, was able to dispense with "Prostigmin" in six months and has led a normal life for two and a half years. The authors of the report consider supervoltage better than ordinary deep X-ray therapy.

Miscellaneous Conditions.

Some non-malignant conditions that may be treated with radiotherapy have already been mentioned. The list could be greatly extended by referring to inflammatory and arthritic conditions, various dermatoses, menorrhagia and even unresolved pneumonia, and this by no means exhausts the list.

Radioactive Isotopes.

Instead of dwelling upon such matters I shall return to the subject of isotopes, which have already been mentioned in connexion with both investigation and treatment. Thus radioactive phosphorus, P^{32}, it has been stated, has been used for polycythæmia and the reticuloses, radioactive iodine, I^{131}, for thyroid conditions, radioactive sodium, Na^{24}, for treatment of cancer of the bladder, and radioactive cobalt, Co^{60}, for interstitial or intracavitary use, while cobalt beam units have been planned.

Two or three others perhaps deserve brief mention. Thus radioactive bromine, Br^{82}, can be used in latex bags in body cavities to give intense β irradiation, and it has also been used in this manner to treat a cavity in the face caused by a rodent ulcer.

Radioactive tantalum, Ta^{182}, is a γ emitter and can be used as wire for insertion in the same way as radium needles, while the idea has been expressed that, as this metal is often used in connexion with skull surgery and is chemically and physiologically inert, it might form a useful medium for irradiating the cranial contents.

Finally, a colloidal suspension of radioactive gold, Au^{198}, has been introduced into the pleural cavity to deal with malignant pleural effusion.

Radioactive isotopes are dangerous and call for the greatest care in use. It is these substances that make it necessary for our physicists to be equipped with such machines as Geiger counters and scintillation counters, so that we may know how effectively the treatment is being carried out and also to give an indication of the safety or otherwise of the procedure.

The Linear Accelerator.

A little must be said about the four million electron volt linear accelerator which the Anti-Cancer Committee of the University of Adelaide hopes to provide before too long. As its name implies this is a machine in which electrons are greatly speeded up in their passage from the cathode to the target; but unlike a betatron, in which they are whirled in a circle, in this apparatus they follow a straight line. Their speed may even be raised to something near the speed of light, and on their striking the target X rays of very high frequency are generated.

These rays are of great intensity and penetration and should make the treatment of deep-seated tumours more effective though not more simple. It will be particularly useful for bulky patients and for lesions in the pelvis, abdomen, mediastinum, lungs and skull. The radiation is so penetrating that a close watch must be kept not only upon the field of

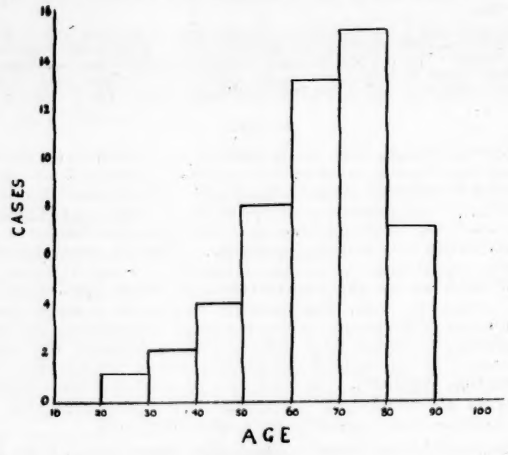

FIGURE I.
Incidence of carcinoma of the tongue.

entrance but also upon the field of exit of the beam from the body. The maximum reaction takes place not in the skin but about one centimetre below the surface. There is little bone absorbtion at this voltage. These illustrations show that its use poses very definite problems.

It is of interest to note that X rays of extremely high frequency will generate radioactivity in the tissues of a patient. According to Mayneord this is not significant and below 16,000,000 electron volts is completely unimportant.

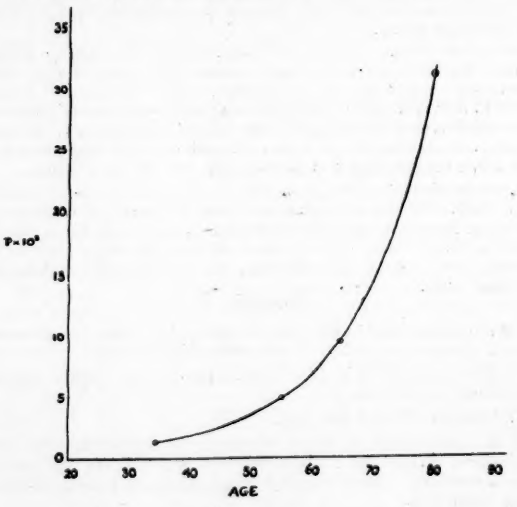

FIGURE II.
Relative frequency of incidence of carcinoma of the tongue.

As can be readily understood, the use of such powerful apparatus calls for the most rigorous checks, measurements and safeguards. In 1933 I pointed out how essential were the services of physicists to a radiotherapeutic department. Such services are vastly more necessary now. The Anti-Cancer Committee now provides three full-time physicists, most of whose work is performed at the radiotherapy clinic.

Two years ago the committee sent Mr. B. W. Worthley, our head physicist, to England and America, and among his important activities was a period he spent at the Royal Cancer Hospital, Fulham, where he worked for some appreciable time with a machine known as an optical integrator.

Since his return, in conjunction with Mr. M. J. Tooze, our second physicist, he has constructed an improved version of this machine which is thought to be the second of its kind in the world. With this apparatus isodose curves and depth doses can be plotted for any individual case whether the irradiation be from radium or X rays or a combination of the two.

When the accelerator is in use this machine will be a sheer necessity, but even at present its benefit is felt in the department. The isodose curves for each case can be photographically reduced in size and incorporated in the permanent records.

When the accelerator and the new deep X-ray machine are installed, the radiotherapy department should be for the moment well set up. But no doubt new machines will be conceived, manufactured and demanded.

I have referred to the use of powerful radioactive cobalt beam units. Should an atomic pile on the shores of Spencer's Gulf come into being, even this should be within the bounds of possibility, while the use of short-lived isotopes should become a commonplace.

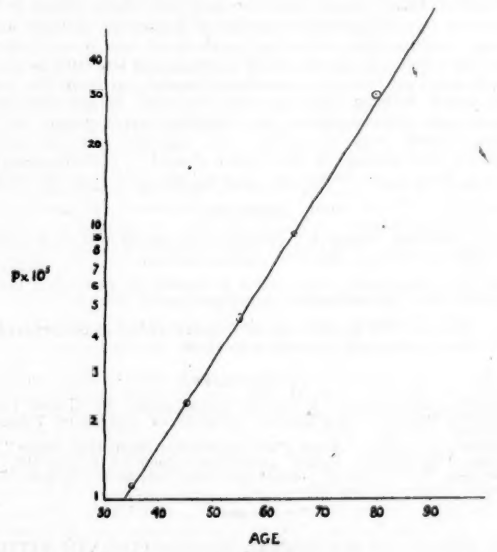

FIGURE III.
Logarithm of relative frequency of carcinoma of the tongue.

Cancer and Age.

Although not strictly within the scope of this paper, there is a postscript I should like to add which has reference to tables showing the incidence of a disease according to age.

Some eight years ago when investigating cancer of the tongue I found that the ordinary table plotting frequency against age looked like Figure I. With the exclusion of cases in females as too few in number to give information of value, the actual figures for males, according to age groups, for the period chosen were as follows: 21 to 30 years, one case; 31 to 40 years, two cases; 41 to 50 years, four cases; 51 to 60 years, eight cases; 61 to 70 years, 13 cases; 71 to 80 years, 15 cases; 81 to 90 years, seven cases.

This covered hospital patients only and neglected those treated in private, but it may perhaps be assumed that the distribution would be at least somewhat similar. The actual totals of males in South Australia in each age group were then obtained from the Government Statist, and the number of cases in each group was plotted against the total number of persons in the group.

Expressed as a graph, the curve became increasingly steep, as in Figure II, and on semi-logarithmic graph paper it became a straight line (Figure III), indicating that the curve was exponential in character and the progression therefore geometrical.

The point that I wish to make is that in the ordinary additive table it is only the smaller number of individuals in the older age groups that makes the incidence curve appear to fall away. In actual fact, for cancer of the tongue in males for the period in question it was rising ever more steeply right up to and including the oldest age group. Much the same was found for cancer of the larynx, although the numbers were smaller.

We know that cancer may occur at any age from intrauterine life to the most advanced old age. This small investigation helps to show the significance of age in the occurrence of cancer at two sites.

Acknowledgements.

In conclusion I should like to thank Dr. Colin Gurner and Dr. B. S. Hanson for permission to refer to certain of their cases.

SALT BALANCE: THE USE OF "CHLOREST PAPER A".

By M. P. K. SHOOBRIDGE,
General Hospital, Launceston, Tasmania.

WHEN the Launceston General Hospital first began to take an active interest in the problem of salt and water balance, particularly of patients receiving intravenous therapy, I was approached about the possibility of using Fantus's test (Fantus, 1936) for chloride in the urine. I came to the conclusion that this test was unsuitable for two reasons—namely (i) inaccuracy of the test when the urine contains small quantities of chloride (say 0·5 up to 2·0 or 3·0 grammes of chloride per litre) and (ii) the very real danger of contamination of the reagents when used by unskilled persons, with reporting of grossly inaccurate figures for chloride concentration as a consequence of such contamination. This hospital therefore adopted a system in which for every patient having intravenous therapy a "fluid and salt balance chart" is kept, the urine is saved in a large bottle, and at the end of twenty-four hours an aliquot part is sent to the laboratory and tested for chloride content by silver nitrate: ammonium thiocyanate titration. The result is given as grammes of chloride (expressed as sodium chloride) per litre, and also as grammes of chloride excreted per twenty-four hours.

This system works very well within a large hospital with adequate laboratory facilities, but is impracticable for use in small private hospitals or, indeed, for any hospital where there is any great delay between the dispatch of specimens to the laboratory and the receipt of the laboratory report. I was therefore very interested in the article by Dr. John Devine (1951), in which he described a simple chloride-testing paper for use by untrained persons. Messrs. Felton, Grimwade and Duerdins, Proprietary, Limited, kindly supplied me with a sample carton of their "Chlorest Paper A", which I tested on known dilutions of sodium chloride in water, and also on every sample of urine and gastric content which was sent up to the laboratory during a two-week period. Some of the ward urine specimens were heavily coloured with pigment, and cloudy with pus, blood, phosphates *et cetera*, whilst the gastric contents were often extremely dirty, with copious quantities of regurgitated bile, with mucus, and even with partially digested food, present in them.

The results were very encouraging. Using the makers' graph and their end-point, I found that accurate chloride estimations could be made both quickly and easily, provided that the urinary chloride concentration was somewhere between one and four grammes per litre, which is the range of greatest clinical interest. However, I found that I tended to take a somewhat later end-point than the people who drew up the original calibration graph. I therefore drew another graph to suit my own technique (using standard chloride solutions, in distilled water, of 5·0, 4·0, 3·0, 2·0, 1·5, 1·0, 0·75 and 0·5 grammes of sodium chloride per litre). I found that this new graph had the advantage that I could make accurate estimations of urinary chloride when there was as little as 0·4 gramme per litre. With this modification I discovered that, in the range 0 to 2·5 grammes per litre (0 to 0·25 gramme *per centum*) the "Chlorest Paper A" test

gave a figure within 0·5 gramme of the true value, and usually closer even than this. For the range 2·5 to 4·0 grammes per litre the answer was usually within 0·5 gramme of the correct value, but occasionally the difference was slightly greater, although never more than one gramme per litre. For values greater than 4·0 grammes per litre the result should be given as such; that is, "more than 4·0 grammes per litre", instead of an artificially exact figure such as "5·5 grammes per litre". Alternatively, the specimen may be diluted to one-half, or one-quarter, with distilled water, and the test repeated.

I am very impressed with the simplicity of the method, the fact that it is relatively foolproof, and its degree of accuracy, particularly in the range 0·5 to 4·0 grammes per litre (0·05 to 0·4 gramme *per centum*), which of course is the range of most interest clinically. I believe this test to be infinitely preferable to the better known "Fantus's test", the latter being particularly unreliable with urine having a low chloride content (0·5 to 2·0 grammes per litre).

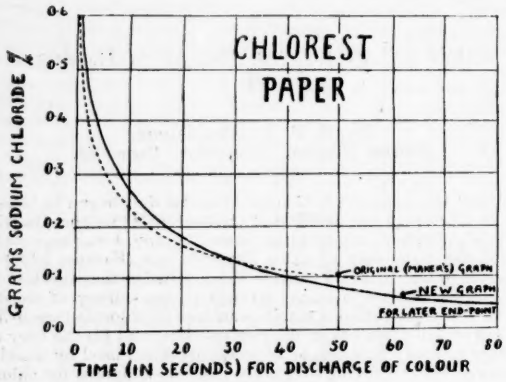

FIGURE I.

The end-point I used for making up the revised graph is the total discharge of colour, not taking into account very minute amounts of brown left on the paper, but waiting until all the major coloured areas have disappeared (including any mottled areas of brown, or any largish specks—say any coloured areas greater than two millimetres in diameter). This later end-point is more difficult to describe adequately in printed instructions than the end-point advocated by the makers (namely, complete bleaching of colour, no notice being taken of any brown specks left on the paper). If anyone wishes to take advantage of the increased accuracy provided by the later end-point, I would strongly advise them to prepare a series of known dilutions of sodium chloride, as indicated above, and draw up their own graph. This will then automatically correct for any individual variations in selection of the end-point. However, for the occasional user, the end-point selected by the makers, used in conjunction with the graph supplied by them, gives results which are perfectly adequate for general clinical purposes.

I have had many inquiries about the clinical application of urinary chloride estimations and their interpretation. The question is difficult to answer in a few words, and I have usually referred my questioners to the article by H. L. Marriott (1947) as being the best résumé of the subject in a readily available journal. The commonest question has been: "What is the normal urinary chloride level?" To this I reply that there is no "normal" urinary chloride level; the chloride excretion depends on intake and body requirements, the excess of chloride being excreted in the urine. Usually, a trace of chloride in the urine means insufficient intake of sodium chloride, but occasionally (as in kidney disease, and sometimes following operation or in cases of mild shock) the kidneys are unable to excrete chloride satisfactorily; or quantities of sodium may be excreted, without a parallel loss of chloride; when such a state of affairs exists a low urinary chloride figure may prove very misleading. In such cases a plasma chloride estimation and possibly other biochemical investigations (estimation of urinary and serum sodium contents, carbon dioxide combining power of plasma or plasma bicarbonate *et cetera*) would have to be performed to establish a "base line" on which to work. As far as a "normal" urinary chloride level is concerned, more reliance should be placed on how the body deals with the sodium chloride presented to it than on any one isolated estimation. In other words, a salt, or chloride, balance chart should be started for the patient, the intake being plotted against the output, over a period of several days. If a rapid assessment of the condition of a seriously ill patient is required, there is no simple alternative to the full gamut of biochemical investigations. In addition to the tests already mentioned, a plasma and blood volume determination (with Evans blue, T 1824) may sometimes be of help in assessment of the true state of affairs. The average patient, who is secreting adequate quantities of urine, is usually in a condition of "salt balance" when he is excreting somewhere between two and five grammes of chloride per litre. But the over-all picture is the only guide. For instance, in a condition of health, I myself usually excrete between 10 and 15 grammes of chloride per litre, my twenty-four hour excretion of urine being one to one and a half litres. Obviously, I am one of those people who like their food liberally seasoned with salt.

A word of warning: the "Chlorest" test should be performed only in wide-mouthed test tubes (tubes of three-quarters of an inch internal diameter are suitable), as the time for discharge of colour may be much longer in small test tubes, with insufficient agitation. The paper must be wetted instantaneously, and not allowed to stick to the sides of the tube. To obviate these possible sources of error, I tear off half a paper, fold it in two (the crease being placed down the long axis of the paper) so that there are two elongated rectangles of paper, set at right angles to one another (like a piece of angle-iron), and drop it cleanly into the urine. A stopwatch is started, and the tube is shaken gently until all the colour has been discharged from the paper. The watch is then stopped, and the time in seconds noted. For rough determinations an ordinary wrist watch, with a second hand, may be used. The makers' note concerning handling and storage of the papers should be strictly observed, that is, keep away from light, and handle only with dry fingers.

Summary.

1. "Chlorest Paper A" provides a reliable and easy method for testing urinary chloride concentration.

2. A more sensitive end-point is described, providing greater accuracy for low chloride concentrations.

3. Some of the limitations of urinary chloride concentrations as a clinical guide are briefly indicated.

References.

Devine, John (1951), "A Chloride-Testing Paper for Clinical Use by Untrained Persons", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, page 264.

Fantus, B. (1936), "Fluid Post-Operatively: Statistical Study", *The Journal of the American Medical Association*, Volume CXIV, page 107.

Marriott, H. L. (1947), "Water and Salt Depletion", *British Medical Journal*, Volume I, page 245.

A STUDY OF MATERNAL Rh AGGLUTININ TITRES IN PREGNANCY.

By J. WATSON and G. H. VOS.

From the Department of Public Health Laboratories, King Edward Memorial Hospital, Perth.

RECENT literature demonstrates varied opinion as to the significance of the titre of maternal Rh agglutinins in pregnancy. Wiener, Wexler and Shulman (1948) hold that a high titre present for only a short time during pregnancy is of much greater significance than a low titre persisting for a long time. Sacks, Kuhns and Jahn (1947) state that a low titre present for a short time before the birth of the infant is usually associated with a mild type of hæmolytic disease. Bryce *et alii* (1951) regard higher titres generally as associated with the more severe manifestations in the infant, but with individual exceptions. In contrast to these views, Diamond (1947) states tha a prognosis based on antibody tests must be offered with reservations, while Walsh and Arnold (1951) question whether titrations have any real value in the management of cases in which iso-immunization is occurring. However, more recently Wiener, Nappi and Gordon (1951) suggest that ante-natal antibody titre tests carried out by the albumin-plasma conglutination method do assist in the management of pregnancies in sensitized Rh-negative mothers.

It is possible that this divergence in views is due to differences in the technique used in carrying out the antibody titrations, and, in fact, a striking feature of titre results so far published is the wide variation of figures, which suggests a lack of standardization in technique and methods adopted. Walsh and Arnold (1951) point out that widely different results may be obtained on different days on the same sample of serum, and it is well known that each of the commonly used methods of titration for the Rh agglutinins may show pronounced differences of end-point readings for the same serum.

Of the two forms of antibodies found, there can be little doubt that the blocking, monovalent or incomplete antibody is of greater significance than the saline, divalent or incomplete form. It is therefore upon the incomplete antibody that most attention has been focused. Numerous techniques have been described for the titration of the incomplete antibody, with the use of different diluting media for the serum and suspending agents for the cells. A potent antiserum is often found to give unduly variable titration results when tested against the same cells under these conditions. On the other hand, a carefully standardized indirect antiglobulin technique has been found to give consistently reliable results when the titrations of the serum of an immunized woman are compared at varying intervals during pregnancy. Such results were not obtained if either the albumin or the conglutination technique had been used. The detail of the technique which we have employed has been set out by Kelsall and Vos (1951), and is based on the tests originally described by Coombs, Mourant and Race (1945).

We have used a standardized indirect antiglobulin technique to reexamine the relationship between the maternal antibody titre during pregnancy and the subsequent manifestation of hæmolytic disease, if any, in the new-born infant. The present paper, although dealing with a small batch of cases, presents results which suggest that a prognosis can be made as pregnancy progresses.

The relationship between the Rh agglutinin titre in the mother at term and the titre level in the cord blood has been studied in detail with respect to the prognosis and management of the child after birth, and is discussed in another publication (Kelsall and Vos, 1951).

The Application of Indirect Antiglobulin Titration Technique to the Study of the Maternal Rh Agglutinin Levels during Pregnancy.

During this investigation we have examined 3170 cases for routine A B O grouping and Rh typing, anti-Rh agglutinin test and Kahn test. These cases represent all admissions to the King Edward Memorial Hospital ante-natal clinic for the period from February, 1950, to March, 1951, as well as private patients referred to this laboratory as a result of previous or suspected history of Rh immunization. Thus our cases cannot be regarded as entirely unselected. This may account for the higher incidence of agglutinins found in Rh-negative mothers in our series—that is, 7·1% compared with less than 5%, which is the normally accepted figure (Pickles, 1949). It is also a little higher than Bryce's figures (1951) of 6·7% of Rh-negative mothers who subsequently gave birth to Rh-positive infants. However, we have abandoned the albumin and conglutination techniques for the detection of agglutinins in favour of the indirect antiglobulin method, and this may be a partial explanation for our higher figure.

Each patient was examined at the first visit. Those found to be Rh-negative were examined for anti-Rh agglutinins, and in cases in which these agglutinins were detected, further examinations were carried out at monthly intervals until the seventh month and then weekly or fortnightly until delivery.

In cases in which no anti-Rh agglutinins were detected, examinations were repeated at monthly intervals. These cases have not been tabulated in our series, and represent a total of 92·9% of the total number of the Rh-negative patients. In none of these cases was there clinical or laboratory evidence of hæmolytic disease in the infant. The tests have been carried out by the same worker (G.H.V.) in order to minimize personal error.

The cases tabulated represent all those in which anti-Rh agglutinins were found during the period under review, and in which two or more titration tests were possible before delivery. The titre results tabulated have all been obtained by the indirect antiglobulin method. Cord blood samples were taken at birth from all live-born infants, and direct and indirect antiglobulin tests were carried out. In recording the results of the direct antiglobulin reaction we have used "+++" to indicate complete agglutination, "++" delayed agglutination, and "+" weak, delayed agglutination.

Thirty cases are included in this report and are classified into four groups—A, B, C and D—on the basis of the severity of the hæmolytic disease in the new-born infant (see Table I).

Group A.

The seven patients in Group A produced stillborn infants. The terminal maternal Rh agglutinin titre was high in every case, four mothers having a titre of 1024, one a titre of 2048 and two titres of 4096. These cases were characterized by higher than average titres throughout pregnancy, the lowest titre recorded being 512. Moreover, these results are uniform, with the exception of Case VII, in that a titre of 512 or higher was presented at the sixth month. In one only of the remaining 23 cases was a titre of this level present so early in pregnancy, and in this case the child died subsequently.

Group B.

The eleven infants in Group B were all suffering from severe hæmolytic disease at birth, the clinical diagnosis of *icterus gravis* being assigned in each case. The terminal maternal agglutinin titre was more variable than in the previous group, but the mean terminal titre of 760 is comparable with that for Group A. The titres during pregnancy for these eleven mothers show a pronounced tendency to start at relatively low levels and rise sharply to the terminal value. In Case IX we have insufficient data to correlate in this way, while Cases XI, XII and XVIII maintained steady titres throughout pregnancy.

Group C.

Seven mothers in Group C gave birth to infants mildly affected with hæmolytic disease either at birth or within ten days of delivery. The clinical manifestation was recorded as anæmia of the new-born. The maternal Rh-agglutinin levels were relatively low throughout pregnancy, and the terminal titre ranged from 16 to 64. The titre levels were low and steady throughout pregnancy, or low with a slowly rising titre toward term. Case XXIV is the only exception in this group, the antibody titre falling from a value of 256 in the third month to 32 in the thirty-seventh week.

Group D.

Group D comprised five infants whose cord blood sample gave a negative response to the direct antiglobulin test, the father being probably heterozygous in each case. The child was unaffected, even though the cord blood sample gave indirect antiglobulin titrations identical in each case with that in the maternal serum at term. The significance of this finding has been commented on more fully in another publication (Kelsall and Vos, 1951).

In each case the mother had been immunized by a previous pregnancy; but the antibody level fell during pregnancy from initially high levels in Cases XXVI and XXVIII to low levels at term. In Case XXVII the antibody level was falling also, and in Cases XXIX and XXX, although the titres remained unaltered for two and three examinations, it is possible that the level had fallen before our initial samples were taken

Discussion.

The foregoing results indicate clearly the usefulness of routine agglutinin titre determinations by the use of the indirect antiglobulin technique in assessing the likely effect of Rhesus incompatibility on the new-born infant. The usefulness of the technique is enhanced if the determinations start early during pregnancy, at the third month. High titres at this time—that is, values of 512 or more—if they are maintained or rise, are of grave prognostic significance, especially if the father is homozygous. If the titres are low early in pregnancy, the levels should be checked carefully at regular intervals, and a sharp rise toward the end of pregnancy is also of grave prognostic significance, the child almost certainly being severely affected and requiring attention either immediately or shortly after birth.

Steady values at a low level, or values which tend to fall as pregnancy proceeds, may be taken as having doubtful prognostic value if a precise diagnosis is required. In general, the infant, if affected at all, will be only mildly affected.

TABLE I.

Case Number.	Patient's Designation.	Parity.	Previous Obstetric History.	Interval Since Previous Pregnancy. (Months.)	Husband's Genotype.	Indirect Coombs Titration: Month of Gestation.									Week at which Delivered.	Indirect Coombs Titre on Cord Sample at Birth.	Direct Coombs Test.	Type of Disease: Group.	Severity of Disease and Fate of Infant.	Type of Transfusion.
						1	2	3	4	5	6	7	8	9						
1	MTS	3	First child normal; second died—Rh factor.	16	CDe/CDe.					512	512	1024	1024					A	Stillborn.	—
2	THMS	3	First child normal; second died—Rh factor.	9	CDe/CDe.			1024	1024	1024	1024	1024						A		—
3	BRST	5	First child normal, second stillborn; third and fourth pregnancies miscarriage.	14	CDe/CDe.						512	1024	1024					A		—
4	LTZ	5	First child normal, second died soon after birth; third and fourth stillborn.	20	CDe/CDe.					512	512	512	1024	1024				A		—
5	STLND	4	First child normal, second died—Rh factor; third stillborn.	14	CDe/CDe.					1024	2048	2048	2048					A		—
6	GRN	3	First child normal, second died soon after birth—Rh factor.	12	CDe/cDE.	2048	4096	4096	4096	4096	4096							A		—
7	MLR	6	First, second, third and fourth children normal; fifth jaundiced at birth.	18	CDe/cDE.						128	128	2048	4096				A		—
8	COCKM	5	First child normal, second jaundiced, third normal; fourth died soon after birth.	18	CDe/cde.		256	512	512	512	512	512	1024	2048	39	512	+++	B	Severe; died.	—
9	BUN	5	First and second children normal; third and fourth died soon after birth—Rh factor.	13	CDe/CDe.								1024	1024	39	512	+++	B	Severe; lived.	Ex. tr.[1] S. tr.
10	GRTL	6	First child normal, second died, third and fourth normal, fifth stillborn.	12	CDe/cde.						128	512	1024	2048	38	128	+++	B	Severe; died.	—
11	FLTE	4	First, second and third children normal.	16	CDe/cde.							128	128	128	F.T.	16	++	B	Mild; lived.	Ex. tr.
12	DST	2	First child normal.	48						128	128	128	128	128	39	16	++	B	Mild; lived.	Ex. tr.
13	BLGT	5	First, second and third children normal; fourth died—Rh factor.	48	CDe/CDe.						64	128	1024		38	256	+++	B	Severe; died.	Ex. tr.
14	DY	2	First child normal.	15	CDe/CDe.							32	64	128	39	32	++	B	Mild; lived.	Ex. tr.
15	BDF	3	First pregnancy, miscarriage; second child normal.	12	cDE/cde.				32	32	32	32	64	256	39	128	+++	B	Severe; lived.	Ex. tr.
16	COL	4	First and second children normal; third premature and lived.	12						32	64	128	512		38	128	+++	B	Severe; lived.	—
17	REH	9	First child normal, second and third jaundiced, fourth, fifth, sixth and seventh normal; eighth stillborn—Rh factor.	14				8	32	32	32	32	256	1024	39	128	+++	B	Severe; died.	Ex. tr.
18	IRNS	5	First and second children normal, third pregnancy, miscarriage; fourth normal, not jaundiced at birth.	16	CDe/cDE.						64	64	64	64	39	16	++	B	Mild; lived.	Ex. tr.
19	LNE	3	First child normal; second jaundiced at birth—Rh factor.	12	CDe/cDE.					8	64	64	64		38	8	+	C	Very mild.	S. tr.
20	WET	4	First and second children normal; third died—Rh factor.	20	CDe/cDE.		64	64	64	64	64	64	64	32	40	4	+	C	Very mild.	—
21	MWS	9	First child normal; second, third and fourth jaundiced; fifth died; sixth and seventh jaundiced; eighth died.	36				4	16	16	64	64	64		37	8	+	C	Very mild.	S. tr.
22	BRG	3	First child normal; second pregnancy miscarriage at three months.	14				—	—	—	8	16	16	16	F.T.	2	+	C	Very mild.	—
23	BRDE	3	First child normal; second jaundiced at birth.	12	CDe/cDE.					64	64	64	64		38	8	+	C	Very mild.	—
24	HTF	2	First child stillborn (full term).	8	cDE/cde.			256	256	128	128	64	32		37	4	+	C	Very mild.	—
25	HRST	3	First child normal; second jaundiced at birth.	24	CDe/cDE.			4	4	16	16	16	16	16	39	2	+	C	Very mild.	—
26	BRBT	5	First child jaundiced at birth; second stillborn; third and fourth pregnancies, miscarriage.	24	CDe/cde.		1024	256	256	256	256	256	128		38	128	−	D		
27	SE	5	First child normal; second pregnancy, miscarriage (six weeks); third child died—Rh factor; fourth pregnancy, miscarriage at three months.	18	CDe/cde.						256	128	128		36	128	−	D		
28	GRHM	5	First and second children normal; third pregnancy, miscarriage; fourth child stillborn.	18	CDe/cde.			256	256	256	256	256	128	64	39	64	−	D		
29	WDL	3	First child normal; second stillborn.	36	CDe/cde.							64	64		38	64	−	D		
30	THK	3	First child normal; second died soon after birth.	18	cDe/cde.						32	32	32		38	32	−	D		

[1] "Ex. tr." = exchange transfusion; "S. tr." = simple transfusion.

Summary.

1. A discussion of 30 Rh-negative mothers before confinement is presented. Antibody titres have been followed from two months to eight months before delivery.

2. All titrations were performed by a standardized antiglobulin technique.

3. The relationship between maternal titre and the outcome of pregnancy is described and discussed.

4. In our series, a clear association between a high titre immediately prior to delivery and the severe forms of hæmolytic disease of the new-born is shown.

5. In these series no stillbirths occurred when the terminal maternal antibody titre was low.

6. Infants affected with *icterus gravis* were found in pregnancies in which the final maternal titres before delivery were 64 or greater.

7. The milder form of hæmolytic disease occurred in cases in which the maternal titre immediately prior to delivery was below 64.

8. The behaviour of maternal titres throughout pregnancy in Rh-negative women subsequently giving birth to unaffected Rh-negative infants is described.

9. In our series a terminal rise in maternal titre appeared to be of grave prognostic significance.

Acknowledgements.

We wish to thank Dr. W. A. Young, Director of Public Health Laboratories, Western Australia, for permission to carry out this investigation and for his assistance at all times. We also wish to thank Mr. R. T. Simmons, Commonwealth Serum Laboratories, Melbourne, for his comments, and Mr. R. Kirk, Department of Biology, University of Western Australia, for advice in compiling the paper. Our thanks are also due to the matron and staff of King Edward Memorial Hospital for their cooperation.

References.

Arnold, B. J., Walsh, R. J., and Herzger, the late R. (1951), "A Study of the Significance of Rh Antibody Titration During Pregnancy", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 301.

Bryce, L. M., Jakobowicz, R., Graydon, J. J., and Campbell, K. (1951), "The Incidence and Effects of Rh Incompatibility Between Mother and Child", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 781.

Coombs, R. R. A., Mourant, A. E., and Race, R. R. (1945), "Detection of Weak and 'Incomplete' Rh Agglutinins: New Test", *The Lancet*, Volume II, page 15.

Diamond, L. K., and Abelson, N. M. (1945), "The Detection of Rh Sensitization: Evaluation of Tests for Rh Antibodies", *The Journal of Laboratory and Clinical Medicine*, Volume XXX, page 668.

Diamond, L. K., and Denton, R. L. (1945), "Rh Agglutination in Various Media with Particular Reference to the Value of Albumin", *The Journal of Laboratory and Clinical Medicine*, Volume XXX, page 821.

Kelsall, G. A., and Vos, G. H. (1952), "The Antibody Titre in Maternal and Infant's Serum as an Indication for Treatment in Hæmolytic Disease of the Newborn", THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, page 349.

Pickles, M. M. (1949), "Hæmolytic Disease of the Newborn", Oxford.

Sacks, M. S., Kuhns, W. J., and Jahn, E. F. (1947), "Studies in Rh-Isoimmunization in Pregnancy; Observations in Series of 96 Sensitized Women", *American Journal of Obstetrics and Gynecology*, Volume LIV, page 400.

Wiener, A., Nappi, R., and Gordon, E. B. (1951), "Studies in Rh Sensitization; Effect of Rh Positive Pregnancies on Rh Antibody Titres", *Blood*, Volume VI, page 789.

Wiener, A. S., Wexler, I. B., and Shulman, A. (1948), "Therapy of Severe Erythroblastosis Fœtalis with Repeated and Massive Exchange Transfusions", *American Journal of Clinical Pathology*, Volume XVIII, page 141.

DIFFERENT STANDARDS IN THE CLASSIFICATION OF HYPODERMIC NEEDLES

By DAVID MONK ADAMS,

Department of Physiology, University of Sydney.

ONE has usually little trouble in deciding what diameter of hypodermic needle should be used in a particular instance. However, when it comes to describing that particular diameter in terms of a number, some of us are sometimes mildly confused. This confusion is made even greater if one is aware of the fact that there are three entirely different classifications in use in describing the diameter of hypodermic needles in this country.

When reference is made to the gauge of a hypodermic needle, it is usual in the United Kingdom, Australia and Germany for this gauge to be the same as the Standard Wire Gauge (S.W.G.), which is also known as the British Wire Gauge (B.W.S.). However, in Canada, the United States and Latin America any reference to gauge refers to the Brown and Sharp (B. and S.) standard gauge for wire sizes.

The importance of this differenec in standards to medical men here is that all hypodermic syringe needles made in America, and this includes those of the frequently used B.D. Lok and the Luer-Lok, are of the B. and S. standard. Broadly speaking, the nearest B. and S. gauge is one numeral less than the S.W.G. for about the same diameter needle. This can be seen in the accompanying table (Table I).

TABLE I.

Size Number.	Length of Needle. (Inches.)	Diameter in Millimetres.	Equivalent Gauge in S.W.G. or B.S.W.	Nearest B. and S. Equivalent Gauge.
Hypodermic needles:				
20	$\frac{1}{4}$	0·45	26	25
19	$\frac{5}{16}$	0·45	26	25
18	$\frac{1}{2}$	0·45	26	25
17	$\frac{5}{8}$	0·50	25	24
16	1	0·55	24	23
15	1	0·60	23	22
14	$1\frac{1}{2}$	0·60	23	22
12	$1\frac{1}{2}$	0·65	23	22
2	$1\frac{1}{2}$	0·70	22	21
1	$1\frac{1}{2}$	0·80	21	20
0	$1\frac{1}{2}$	0·90	20	19
Serum needles:				
VI	2	0·65	23	22
V	2	0·70	22	21
IV	2	0·80	21	20
III	2	0·90	20	19
II	2	1·10	19	17
I	2	1·25	18	16
0	$2\frac{1}{2}$	1·45	18	15

A greater divergence in numbering exists between the S.W.G. gauge and what is known as the hypodermic size number. This bears no regular relationship to gauge, and in some cases a different hypodermic size number merely indicates a different length of needle. A glance at Table I will show what a breach of international goodwill would occur if an Australian doctor were to tell his American colleague that he was going to inject him with a number 15 needle, which of course to the American would signify a 15 gauge B. and S. needle—the largest type of serum needle.

AN EPIDEMIC OF HÆMOLYTIC STREPTOCOCCAL (GROUP A) INFECTION ASSOCIATED WITH A CONSIDERABLE INCIDENCE OF ACUTE NEPHRITIS.

By R. W. E. MANSER, M.B., B.S. (Melb.),

Medical Officer of Health, Maryborough, Victoria,

and

M. M. WILSON, M.B., B.Ch. (Cantab.),

Assistant Director, Public Health Bacteriology Laboratory, University of Melbourne, Melbourne.

TOWARDS the end of April, 1951, it became apparent that an increasing number of cases of albuminuria following sore throat and of typical acute nephritis were occurring in a country town; at the suggestion of the Chief Health Officer the epidemic was subjected to further investigation.

The town in question is situated in central Victoria, some 100 miles north-west of Melbourne; the population consists of about 8000 people, whose working members are engaged in activities connected with the agriculture of the surrounding district, and in certain secondary industries which are expanding.

Though the town is one of the older settlements of Victoria, there is as yet no sewerage; running through the centre of the town is an open storm drain, which in summer is apt to become a source of obnoxious odours and the breeding place of mosquitoes; this drain is liable to pollution by the effluent of private septic tank systems, particularly in wet weather.

There are four medical practitioners in the town, and the fact that they practise as a group considerably facilitated the investigations.

Course of the Epidemic.

As far back as October, 1950, two children suffering from infected throats were swabbed as possible subjects of diphtheria. From one, Group A hæmolytic streptococci were isolated; while the other yielded hæmolytic streptococci not of Group A.

In January, 1951, the first case of frank acute nephritis presented in a boy of five years, followed in March by a second case in a girl aged three years. During this month no less than six cases of albuminuria were noted. The number of cases of sore throat, some accompanied by a transient scarlatiniform rash and some followed by albuminuria, continued to rise in April. This suggested an "epidemic" with a common source of infection; cases were confined to the urban area, and the milk supply became suspect.

At the suggestion of the District Health Officer and with the assistance of himself and his colleagues, some 140 people were swabbed, including (*a*) those affected (mostly with sore throat), (*b*) those recovered, (*c*) contacts, and (*d*) milk producers and handlers; three carriers of Group A hæmolytic streptococci were found among the milk carters and a number of others on the farms. Of the affected persons swabbed a number had already been treated with sulphonamides or penicillin.

As soon as suspicion fell on the milk supply, the public was advised, through the local Press, to boil all milk before use, and to pay attention to hygiene in the handling of foodstuffs. The distribution of milk from open cans was stopped.

These measures were immediately followed by a reduction in the incidence of clinical infection to an occasional case among the immediate contacts of persons already infected.

Description of Illness.

In the earlier cases the most prominent feature was a sore throat. This was associated with a coated tongue, fever and increased pulse rate.

There were patches of greyish exudate on the tonsils and soft palate.

In the early phase of the epidemic no exanthem was apparent, but later several children had a transient rash, which lasted only a few hours; punctate erythema followed by desquamation was noted in three cases, although it probably occurred in many others.

Those who developed albuminuria did so about ten days after their throat infection. They all had some rise in blood pressure, both systolic and diastolic. A few affected persons examined late in the epidemic had raised blood pressure without albuminuria. In all cases this gradually subsided.

A large number of those affected were remarkably sick, and many, particularly the children, were limp and listless. Many complained of headache and a dull pain in the loins and back.

As the epidemic progressed, more people of all age groups were encountered who complained simply of dry throats; they sought advice only because of the epidemic, and investigation revealed a streptococcal infection of the fauces.

Complications.

The most severe complication was nephritis.

There were eight persons with the classical picture of acute nephritis and between 30 and 40 who had œdema under the eyes, on the dosrum of the hands, or about the ankles, and had a trace of albuminuria which cleared rapidly with treatment.

Many more who had had sore throats admitted, on questioning, that they had noticed swelling under the eyes in the mornings at some time.

Four children had "croup"; one of these was extremely ill, and it was feared that a tracheotomy would have to be performed. After treatment with "Chloromycetin" and a steam tent, however, this measure was avoided.

Two adults had attacks of rheumatic fever following sore throats. Both had previously had rheumatic fever.

Several children complained of sore ears, but penicillin was used and no further aural complications ensued.

One child of five years had spasms of neck retraction, arching of the spine (like a tetanus spasm) and also drawing up of the legs into a squatting position. Whilst in a spasm the child was quite rigid. She had previously been treated with sulphonamide tablets. She was admitted to hospital and given penicillin and "Chloromycetin". In the first twelve hours she suffered six spasms and then improved; she was discharged from hospital in four days.

Several other children and adults had a mild form of bronchitis and a dry cough, which persisted after the throat infection had subsided.

Treatment.

Sulphonamide tablets seemed ineffective in many cases. There were several adults whose throats were eased by tablets (one gramme four-hourly), but who relapsed in two or three days after they stopped taking them. Some cases of albuminuria occurred after treatment with sulphonamides, or with one dose of penicillin (usually 200,000 units) and then sulphonamide tablets.

Crystalline penicillin was effective in preventing complications when doses of 200,000 units twice daily or more were used. Treatment for three days at this dosage seemed effective. It was necessary to restrict dosage to three days as so many people were receiving penicillin.

Many adults had a dosage of 500,000 units twice daily, and with this treatment relief was noted within twenty-four hours.

Six patients, including the child suffering from croup, did not respond to penicillin, and "Chloromycetin" was used with dramatic relief. The dosage used was one capsule of 250 milligrammes two to four times daily for children and three capsules four times daily for adults.

Laboratory Investigations.

Swabbings were taken and sent to the laboratory with the least possible delay, though in some instances they spent nearly two days *en route*; since serum swabs were used, it is probable that even such a long delay would not seriously vitiate the chances of isolating hæmolytic streptococci (Rubbo and Benjamin, 1950).

On arrival at the laboratory, they were plated on gentian violet horse blood agar and streaked on horse blood agar plates to check the existence of viable organisms; plates were incubated overnight at 37° C., the gentian violet plates anaerobically. The plates were examined next day, and the growth of presumptive hæmolytic streptococcal colonies was assessed as nil, scanty, moderate or heavy growth (—, +, ++, +++).

From the primary plates, representative colonies were picked for confirmation with Gram stain, and for Lancefield grouping by means of maltose blood agar plates or by a precipitin test with an acid extraction method. Thirty-five of the Group A strains were then typed; 16 were of type 12, while 10 were of type 22; the remaining nine were distributed among other types.

In addition serum from 14 of the patients with major complications, nephritis or rheumatic fever, was titrated for antistreptolysin, and 10 showed a rise which was considered diagnostic in retrospect of recent β-hæmolytic streptococcal infection.

Discussion.

This outbreak of Group A streptococcal infection was apparently the work of two distinct types—namely, type 12 and type 22.

Stevenson and Ferris (1951) have since produced the following interesting information: in August, 1951, 213 children in the local schools were swabbed; 64 (30%) yielded Group A streptococci, and of these 26 were of type 12. The total type 12 carrier rate was thus 12% some five months after the outbreak.

In the school at a town 85 miles away, the type 12 carrier rate was found to be 13%.

The clinical picture varied between extremely wide limits from symptomless carrier states on the one hand to severe toxæmia followed in some cases by grave renal complications, or recurrence of rheumatic fever, on the other.

Though the organism was not recovered directly from the milk supply, there is strong circumstantial evidence that the spread was milk-borne; affected persons and carriers of streptococcal infection were discovered amongst those concerned in the production or distribution of milk, and as soon as measures were taken to prevent milk-borne spread, the epidemic subsided to a few sporadic cases; in fact in some of the later cases the patients confessed that they had neglected to boil their milk, despite instructions to do so.

The drug of choice appeared to be "Chloromycetin", but penicillin seemed adequate if given in large doses. Dosage of less than 200,000 units twice daily could not be relied on for rapid clearance of throats, although complications did seem less severe.

Sulphonamides have little to recommend them; they were less effective than penicillin, and in some cases failed to prevent the onset of nephritis.

Moral.

Two old lessons can be learned afresh from this story: firstly, that the Group A hæmolytic streptococci must never be regarded lightly, and secondly, that an unpasteurized milk supply is a constant menace to any community.

Summary.

An epidemic caused by hæmolytic streptococcus (A) is described.

When carriers were removed from milk supply and dairies, and the milk was treated, the outbreak subsided.

Severity of cases varied widely.

Acute nephritis was the most serious complication.

Acknowledgements.

Many others besides the authors were concerned in this investigation: we are particularly indebted to Dr. P. Jenkins, Dr. W. A. Baker and Dr. A. Hall for information and for access to their patients, to Dr. Robert Southby and Professor S. D. Rubbo for their advice, to the Chief Health Officer and members of his staff for the results of their field work, and to Dr. Alan Ferris for typing the streptococci.

References.

Ellis, A. W. M. (1941), "The Natural History of Bright's Disease", *The Lancet*, Volume I, pages 34 and 72.

Rubbo, S. D., and Benjamin, M. E. (1951), "Some Observations on the Survival of Pathogenic Bacteria on Cotton-wool Swabs", *British Medical Journal*, Volume I, page 983.

Stevenson, W., and Ferris, A. A. (1951), personal communication.

A CHILD'S POSTURE IN A MOTOR-CAR: POSITION HABITUALLY ASSUMED.

By JEAN MACNAMARA,
Melbourne.

IN 1948, when collecting examples of the effect of the position habitually assumed on the line of growth of young trees, animals and children, I read a description by Mabel Fitzhugh (1941) of California, of a position assumed by young children when standing on the front seat of motor-cars. Mabel Fitzhugh made the following statement:

> The habit of standing on the seat of the automobile, common to most two-four year olds, is responsible for an increasing number of hyper-extended knees. The child stands with feet widespread, and a few inches away from the back of the seat, knees braced back against it to withstand starting and stopping shocks. This position tilts the pelvis, causing lordosis. The shoulders are thrown back, but the head usually is held forward to see out. The hyper-extension is later complicated by knock knees.

I looked for this condition at the time, but hardly expected to find it in Victoria after several years of rationing of petrol.

Recently, a girl, aged two years and seven months, was brought by her parents for advice about the peculiar shape of her lower limbs, which they had noted as increasing during the preceding six months. Her gait showed no abnormality, but the standing position was abnormal.

Figure IA shows the degree of knock-knee, Figure IB her side view when using her upper limbs, and Figure IC her position with resting arms.

I asked her parents whether the child rode in a motor-car, and they volunteered the information that she insisted on standing on the front seat, and spent an average of almost two hours daily in the motor-car. The parents have given me photographs of the child standing naturally in and out of the

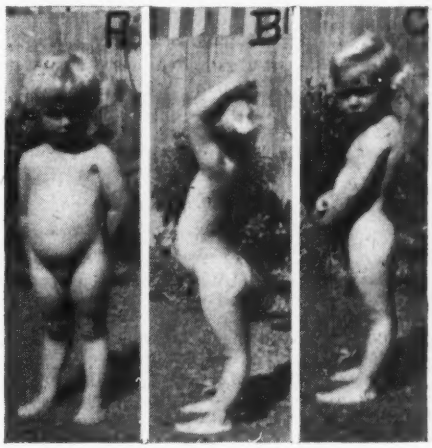

FIGURE I.

car. Unfortunately the side view of her posture when bracing against starts and sudden stops could not be obtained. Her parents assure me that the position of the lower limb in Figures IIA and IIB depicts her method of standing while the motor-car is in motion. The position of her upper limbs in Figure II is posed.

FIGURE II.

The correction of her faulty posture should not be difficult by the following measures. Knock-knee splints will be provided to be worn at night, care being taken that no hyperextension occurs at either knee, in order to give her hamstring muscles and the posterior ligaments of the knee joint the opportunity to "pick up their slack".

She will have a chair to use in the motor-car, high enough to allow her to see out and to make use of the car seat as a foot rest, at the correct distance from her thighs, the seat of the chair being tilted back.

Her parents are taking trouble to provide a chair and table her for work at home.

Comment.

While this condition may not be seen as often in Australia as in the United States, the recognition of the abnormal posture which followed assumption of that position for several hours

each day for six months may be of interest. I have been glad to add it to the varied collection of examples of the effect on growing form of young living things of the position habitually assumed.

References.

Fitzhugh, Mabel L. (1941), *The Physiotherapy Review*, Volume XXI, page 243.

Reports of Cases.

FUNNEL-WEB SPIDER BITE.

By R. S. IRWIN,
Glen Innes, New South Wales.

ON January 31, 1952, J.W., a boy of seven years, was admitted to the Glen Innes District Hospital about 9.30 p.m. with the following history. He had been lying on the kitchen floor in his home at Graham's Valley when he suddenly felt a sharp sting on the lateral aspect of his right arm about the level of the insertion of the deltoid muscle. His father saw a large spider jump from his arm and had the presence of mind to capture the animal without mutilating or destroying it, while his mother sucked at the site of the bite without scarifying and applied a tourniquet to the upper arm.

When I examined him at the hospital his general condition was quite good. His axillary temperature was 97·2° F., his pulse rate was 112 per minute and his respiration rate was 24 per minute. As it was over an hour since the assault had taken place and as the tourniquet was ineffective, it was considered that local treatment would be unavailing; consequently he was put to bed and a hypodermic injection of morphine, one-twelfth of a grain, and atropine, one one-hundred-and-fiftieth of a grain, was administered, followed by an intramuscular injection of 10 millilitres of a 10% solution of calcium gluconate. This was repeated during the night.

I was called to see him early the next morning, when he showed an altogether different picture. His skin was cold and clammy and of a muddy grey colour. His lips were cyanosed. His temperature was subnormal (the thermometer did not register). His pulse was weak and thready (I could not count it myself, but an enthusiastic member of the nursing staff recorded the rate as 180 per minute). His respiration rate was 36 per minute. Bubbling râles could be heard all over his chest. He gave the appearance of impending death, and I told his parents that I could hold out no hope for his recovery. It was felt that something active should be done immediately, and, taking the advice that the apparition of a bloody child gave to Macbeth, I determined to be "bloody, bold and resolute".

Bloody: Venesection was performed and about three-quarters of a pint of blood were removed.

Bold: A hypodermic injection of atropine, one-fiftieth of a grain, was administered.

Resolute: Three thousand units of tiger snake antivenene were injected, 1500 intravenously and 1500 intramuscularly.

Tiger snake antivenene was given for the following reasons: (i) This treatment is recommended not only for tiger snake bite, but also for the bite of any snake (Commonwealth Serum Laboratories, 1948-1949). (ii) The dominant component of the venoms of the majority of Australian snakes is a neurotoxin (Commonwealth Serum Laboratories, 1948-1949), and spider venoms also have a predominantly neurotoxic action (Fairley, 1936). (iii) It apparently does no harm. Lots of tiger snake antivenene was pumped into patients here during the great snake scare of the summer of 1950-1951, when probably quite a large percentage of those thus treated were never in fact anywhere near a snake; and it never caused any ill effects. (iv) It was felt that something should be done, as the child was *in extremis*.

By lunch time the picture had again changed. The patient's colour had improved. His temperature was 100·4° F., his pulse rate 124 per minute and his respiration rate 32 per minute. He was able to take fluid by mouth and vociferously to resent the large intramuscular injections of calcium gluconate which were continued four-hourly.

The next morning he seemed quite normal. His temperature was 98·8° F., and his pulse and respiration rates were 96 and 24 per minute respectively. He was kept in hospital a further three days, mainly to enable dressings to be applied to the venesection wound in his right cubital fossa, and has been quite well ever since discharge from hospital.

The nefarious arachnid was sent to Mr. A. F. O'Farrell, senior lecturer in charge of the Department of Zoology, New England University College, Armidale, who was kind enough to identify it as an average-sized male of the so-called "North Coast funnel web", *Atrax formidabilis* Rainbow, as distinct from the Port Jackson species, *Atrax robustus* Cambridge, which, dwelling in the better-class suburbs north of Sydney Harbour, is far better known. Further, Mr. O'Farrell stated that this was the first definite confirmation he had received that this dangerous species had migrated as far west as the Northern Tablelands.

Discussion.

This case has been reported mainly in the hope that someone will promulgate some authoritative statement on the treatment of arachnid bites. The patient in the case described by Murray (1950) apparently did not exhibit sufficient symptoms to warrant any active treatment at all.

It will be noted that in this case no antihistaminics were employed. The fact that the patient recovered after being so seriously ill makes one wonder if the antihistaminics are as important in these cases as one is led to believe. Presumably people recovered from spider bite before we had any antihistaminics; or would a regular dosage of "Benadryl" elixir throughout the first night have prevented the serious aspect the patient presented the next morning?

On the other hand, no claim is made that the tiger snake antivenene effected the cure; rather it is thought that the combination of venesection and atropine combated acute pulmonary œdema.

The important fact is that the boy recovered. It was a case of *post hoc*, but not necessarily *ergo propter hoc*.

References.

Commonwealth Serum Laboratories (1948-1949), "Handbook of Instructions".

Fairley, N. Hamilton (1936), "Bites and Stings", in "The British Encyclopædia of Medical Practice", edited by Sir Humphry Rolleston, Volume II.

Murray, R. E. (1950), "Bite by Funnel-Web Spider", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, page 16.

Reviews.

DIAGNOSIS OF NERVOUS DISEASE.

IT is pleasing to know that the death of Sir James Purves-Stewart in 1949 has not meant the disappearance from neurological literature of his text-book "The Diagnosis of Nervous Diseases". For forty years this volume has been the *vade mecum* of students and practitioners engaged in the study of disease of the nervous system. The original author referred to the ninth edition as "probably my swan song", and so it turned out to be. He took steps, however, to ensure the continuance of his work by inviting his colleague, Dr. Worster-Drought, to prepare a tenth edition. This has now appeared,[1] and, while it maintains the form of earlier editions, the book has been brought up to date by the amplification of certain sections and by completely rewriting

[1] "The Diagnosis of Nervous Diseases", by James Purves-Stewart, K.C.M.G., C.B., M.D. (Edinburgh), F.R.C.P., and C. Worster-Drought, M.A., M.D. (Cantab.), F.R.C.P.; Tenth Edition; 1952. London: Edward Arnold and Company. 9" × 6", pp. 972, with 388 illustrations, a few in colour. Price: 50s.

some of the chapters. This has necessitated an increase in size of the present edition which contains over 900 pages.

This book is too well known to require detailed analysis. Suffice it to state that in this book the student of clinical neurology will find the various aspects of the subject, from physiological anatomy to electrodiagnosis and the psychoses, briefly but clearly dealt with and freely illustrated. Indeed the diagrams, figures and references in the text greatly add to the value of this volume, which more than maintains the standard of previous editions.

The book is indispensable to undergraduates and graduates alike who are preparing for examinations, and also because of the case records, illustrations and bibliography, it is a valuable work of reference for practitioners as well.

It is fitting that the present editor should have included after the preface to the present edition an appropriate biographical sketch of the original author of this text-book.

"PENICILLIN DECADE."

"PENICILLIN DECADE" is a small book written by L. W. Smith, Medical Director, Commercial Solvents Corporation, and A. D. Walker.[1] It deals with the sensitizations and toxicities of penicillin. The authors give a brief account of the discovery and early use of penicillin, and then launch into a description of its toxic effects. It is amazing what a collection of ill-effects of penicillin they have extracted from the literature. One would almost feel inclined to give up the use of such an apparently dangerous preparation. Urticaria, contact dermatitis, allergic reactions, anaphylaxis, exfoliative dermatitis, and ophthalmic reactions are known to occur, but the authors appear to have selected the most blood-curdling series of such ill effects. The effect of penicillin throat lozenges is particularly emphasized, and perhaps with reason. Insufflations, aerosols for inhalation and ointments are said to frequently give rise to unpleasant effects. Penicillin in beeswax and oil is condemned, and the oral use of penicillin is favoured; 200,000 to 400,000 units daily by mouth are effective for medium or moderately severe infections, due to Gram-positive organisms. Stress is laid on the dangers of penicillin, on the necessity for diagnosis and for using penicillin against the organisms for which it is known to be effective. At the end of the book a new penicillin is mentioned, a salt of 1,2-diphenyl-2-methyl-aminoethanol called P-92 which is said to be much less toxic than all previous penicillins.

PHYSICAL MEDICINE AND REHABILITATION.

IN the series of "Post Graduate Medicine and Surgery" appears a valuable book, "Physical Medicine and Rehabilitation for the Clinician", edited by Dr. Frank Krusen, and with contributions by well-known writers in this field including Howard Rusk and Ralph Ghormley.[2] This is a very complete and very practical compendium set out, for the most part, clearly and concisely and covering a wide field of treatment. Although the primary objective has been to advocate definite lines of treatment, there are sufficient applied physiology and anatomy, and some biochemistry, to make the background interesting and to stimulate further reading. The diagrams are well done.

There is more recognition now of the fact that the restoration of the sick or injured person to health is not always the prerogative of the surgeon and physician, but often can be really efficiently accomplished only by the teamwork of a number of ancillary workers directed by the doctor. This book illustrates how such a team can best carry out its job. Perhaps it is a pity that the field of the book has been made so wide, because this necessitates compressing into a few pages what has to be said about important subjects. For example, the treatment of poliomyelitis is allowed only seven pages. In regard to poliomyelitis, one might perhaps raise an eyebrow at the statement that "artificial supports and braces are to be avoided in so far as possible", although one could agree that the provision of an artificial support or brace is a major decision not to be undertaken as a matter of routine. The contribution by Dr. Howard Polley—"The Clinician Approaches the Problem of Backache"—is a thoughtful and helpful one.

It is good to see that medical conditions, as well as surgical and orthopædic, find their place for discussion, and there are valuable contributions on breathing exercises for asthma and on the rehabilitation of patients with tuberculosis and other chest conditions. A particularly interesting section is that by Howard Rome on "Psychosomatic Problems with Neuromuscular and Joint Manifestations". Dr. Rome points out that the laity has long recognized that certain people can give others a "pain in the neck" by the irritation of their very presence. He would appear to support the contention that this phraseology is not necessarily always metaphorical.

[1] "Penicillin Decade 1941-1951: Sensitizations and Toxicities", by Lawrence Weld Smith, M.D., and Ann Dolan Walker, R.N.; 1951. Washington: Arundel Press, Incorporated. 8½" × 6", pp. 126.

[2] "Physical Medicine and Rehabilitation for the Clinician", edited by Frank H. Krusen, M.D.; 1951. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" × 7", pp. 386, with 96 illustrations. Price: £3 1s. 9d.

FRANCE AND THE CULTURE OF THE WORLD.

PRUDENTLY abandoning what seems to have been their original grandiose aim of a volume which would define the contribution of France to the cultural and scientific development of the world, the editors of "Light Out of France",[1] John G. Stanbury and A. R. Chisholm, offer the public instead a series of essays in which various aspects of this contribution are more or less adequately touched upon by a number of Australian authorities. Some of these essays (notably Professor Lambie's on medicine) are well worth reading for their own sake; while the chapter, not very relevantly introduced, in which Dr. Stanbury paints a remarkably idealized picture of the medical practitioner, should be read by all members of the profession for the glow (of one kind or another) that it must inevitably induce. Most often, however, the vastness of the field to be compassed seems to defeat the individual author, and to produce an unbalanced and inconclusive result. Since the aim of the work is primarily to demonstrate to those unaware of it the continuing richness and vitality of the French genius, a more manageable method might have been to confine the canvas to the last hundred or so years. This would provide a more satisfying answer to contemporary critics, and offer in addition a wealth of material that is hardly glanced at by the present volume.

EMERGENCY SURGERY.

PART IV of the sixth edition of Hamilton Bailey's "Emergency Surgery", now written with the assistance of Norman Matheson, has appeared at last.[2] It is regrettable that there is an interval of four years between the appearances of Part I and Part IV of this edition, with Part V still to come. It is to be hoped that the seventh edition will appear soon in a form more worthy of the text and in one or at most two volumes. The early hopes that the "paper-back" serial form of this edition would enable the whole book to appear quickly have not been fulfilled, so that there will be no need to reproduce this classical work in its present humble dress.

Part IV deals with a wide variety of subjects. It includes the emergency surgery of the thorax and its organs, the head and neck, and orthopædic emergencies.

There is much in it to criticize, but this must be tempered with the knowledge that the work is intended primarily for undergraduate and early post-graduate students and the occasional surgeon called upon to deal with an emergency. With these, one must of necessity be dogmatic, else confusion will be caused.

Rib resection in *empyema thoracis*, for instance, may be performed safely and easily with pethidine-"Pentothal" anæsthesia, especially in those nervous people to whom operations under local anæsthesia are an ordeal. No doubt, when reference is made to acute *empyema thoracis* in the next edition, preliminary injections of streptokinase and streptodornase will be mentioned.

[1] "Light Out of France: French Contributions to Civilization", edited by John G. Stanbury and A. R. Chisholm; 1951. Sydney: Angus and Robertson, Limited. 8½" × 6", pp. 222. Price: 25s.

[2] "Emergency Surgery", Part IV, by Hamilton Bailey, F.R.C.S. (England), F.A.C.S., F.I.C.S., F.R.S.E., assisted by N. M. Matheson, M.B., Ch.B., M.R.C.P. (London), F.R.C.S. (England), F.A.C.S.; Sixth Edition; 1952. Bristol: John Wright and Sons, Limited. London: Simpkin, Marshall, Limited. 10" × 6½", pp. 197, with 311 illustrations, some in colour. Price: 21s.

The gauze used in the pericostal ligature to stop otherwise uncontrollable intercostal hæmorrhage can now be one of the absorbable hæmostatic gauzes. This should not need later removal with its attendant risk of causing the hæmorrhage to start again.

In the discussion of mediastinal emphysema and tension pneumothorax, mention might have been made that these conditions can arise in children in whom a tracheotomy tube (through which oxygen is being blown) has slipped out of the trachea into the surrounding tissues. This accident necessitates immediate replacement of the tracheotomy tube into the trachea and urgent life-saving aspiration of both pleural cavities. Tension pneumothorax can also occur post-operatively, even after thoracotomies for other than lung operations. As the lungs are being expanded by the anæsthetist when the surgeon is closing the pleura, excessive positive pressure may rupture an unsuspected emphysematous bulla or even a normal vesicle and cause a tension pneumothorax. This will require urgent aspiration preferably by a pneumothorax machine so that correct intrapleural pressures can be obtained.

The correct treatment of a traumatic hæmothorax is early and complete aspiration, as was demonstrated repeatedly in World War II. This prevents the later complications of infected hæmothorax or even *empyema thoracis* and fibrinothorax. Early thoracotomy may, of course, be required. In this condition it is probable that with modern facilities a homotransfusion is safer than an autotransfusion from the blood in the pleural cavity.

It would be an excellent idea if a short résumé of correct anæsthesia for surgical treatment of these chest and heart wounds was given here. The intravenous and the local intrapericardiac use of procaine to quieten the damaged heart could be discussed.

As far as breast abscess is concerned, if adequate systemic penicillin therapy is administered and a correct incision used, there is no need to instil penicillin locally into the abscess cavity. The local instillation of penicillin is always attended with the risk of introducing infection with penicillin-resistant organisms.

Papaverine is best applied locally rather than given intravenously to overcome arterial spasm in such conditions as arterial embolism.

In conclusion, a word of warning should be uttered regarding the dangers of the use of tourniquets by first-aid personnel.

CLINICAL PATHOLOGY OF THE EYE.

BERNARD SAMUELS AND ADALBERT FUCHS, the joint authors of "Clinical Pathology of the Eye",[1] both had their early training in pathology with Ernst Fuchs in the hey-day of Viennese ophthalmology. Adalbert Fuchs continued in his father's footsteps in Vienna until he was compelled to seek refuge in Shanghai and America. The conversational style of his lecture demonstrations at the Polyclinic he has adapted to his book, replacing the affectionate harking back to the days of "my father" with prosaic references to E. Fuchs. Although he has an admirable grasp of English, his text in many places becomes obscure and ambiguous because of his attempts to adapt German syntax to the vagaries of our language, and because of his use of words which have no place in our vocabulary. Future editions might well be "ghosted" and greater care given to the elimination of printer's errors.

The plan of the authors is to explain the clinical findings in diseases of the globe by the study of carefully prepared celloidin sections stained with hæmatoxylin and eosin. The value of the more recent methods of staining of the whole retina by the Hotchkiss-McManus technique as well as the micro-injection processes is acknowledged, but no use is made of them or of the variety of histological stains which are of such value in the accurate differentiation of tissue structure. The authors have planned wisely in deliberately avoiding all reference to the abstruse and the rare.

After studying the details of the histology of inflammation with the help of carefully prepared coloured drawings, the reader joins in a personally conducted tour of the diseased eyeball. With a treasure house of sections from which to cull specimens, the book is liberally illustrated with drawings in black and white as well as in colour.

With so much to describe, it is unfortunate that the authors succumb to the bait of the inevitable red herring and present theories for which they can present no evidence. For this reason, the constant stressing of the role of tuberculosis in the ætiology of intraocular inflammation is not to be taken seriously.

The best wine is kept until last. The two chapters on the pathology of surgery and of injuries are of great value. Few surgeons have sufficient detachment of mind to pursue their failures to the end, and too often the eye lost as a result of injury is discarded. To this must be added the lack of facilities for their investigation in this country. In masterly fashion Fuchs demonstrates why the surgeon failed with his trephine, and presents the histological evidence on the relative merits of intracapsular and extracapsular extractions, as well as those of complete and peripheral iridectomy. He issues a warning against the risk of meddlesome attempts to retrieve the dangerously wounded eye. For these two chapters alone, the book will be of tremendous value to the ophthalmic surgeon. The beginner will find it helpful in his study of microscopic sections, and for the clinician it will be a valuable source of reference.

[1] "Clinical Pathology of the Eye: A Practical Treatise of Histopathology", by Bernard Samuels, M.D., and Adalbert Fuchs, M.D.; 1952. New York: Paul B. Hoeber, Incorporated. 11" x 8", pp. 438, with 418 illustrations, 191 in colour.

A COLOUR ATLAS OF HÆMATOLOGY.

AN atlas of hæmatology, compiled by Geneva A. Daland, a qualified technician in hæmatology, has been published as a companion volume to "A Syllabus of Laboratory Examinations in Clinical Diagnosis", which was reviewed in these columns on April 12, 1952. Both books are edited by Thomas Hale Ham, Assistant Professor of Medicine at Harvard Medical School, and were written primarily for the use of medical students. A foreword states that the purpose of this atlas is to furnish a guide for reference to the study of films of peripheral blood stained with Wright's stain. "The maturation of the blood cells is described and shown in a series of diagrams and plates, so that immature and abnormal forms may be recognized in the peripheral blood or bone." So runs the foreword, and the author emphasizes the fact that these illustrations are "oversimplified for use as working hypotheses by those who are concerned with diagnosis and treatment". Even so, it is surprising to find no mention whatever of the megaloblastic series; the author's views on the subject of erythropoiesis evidently differ from those generally held. Apart from this, the book is quite a good one. The appearances and clinical interpretation of blood films from patients with various types of anæmia and leuchæmia, with infectious mononucleosis and with other hæmatological conditions are described and illustrated by a series of excellent coloured plates. Much useful information of a practical nature is here, efficiently and beautifully set out. This book can be recommended to medical students and technicians, provided it is used in conjunction with a standard text-book on hæmatology.

GLAUCOMA.

"THE GLAUCOMAS", by Saul Sugar, is a small book of some 470 pages in which the author has presented an admirable account of the salient aspects of the glaucoma problem.[2] He has summarized herein all the important literature without entering into an exhaustive account of the subject. This was probably intended, as the book is the result of a series of lectures and papers given to post-graduate students in ophthalmology. The book is divided into 29 chapters, and to the end of each is appended an exhaustive bibliography. The chief value of the work is to be found in the precise and excellent review of the primary and secondary glaucomas.

The author classifies primary glaucomas as chronic simple (with a normal angle width), which may be non-congestive or congestive, and acute (narrow angle) glaucoma, which also may be non-congestive or congestive. His classification of secondary glaucoma is based on whether the glaucoma is due to mechanical blockage of trabecular spaces, to lack of

[1] "A Color Atlas of Morphologic Hematology, with a Guide to Clinical Interpretation", by G. A. Daland, B.S., edited by T. H. Ham, M.D.; 1951. Massachusetts: Harvard University Press (Geoffrey Cumberlege). Melbourne: Oxford University Press. 10¾" x 8¼", pp. 74, with nine figures and fourteen coloured plates by Etta Piotti. Price (Australian): 52s. 6d.

[2] "The Glaucomas", by H. Saul Sugar, M.D., F.A.C.S.; 1951. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 9" x 6", pp. 496, with 123 illustrations. Price: £6 6s.

communication between anterior and posterior chambers, to irritation of the ciliary body, to obstruction of the venous drainage, to newly proliferated anastomotic vessels involving Schlemm's canal, to trauma, to epidemic dropsy, to choroidal angioma, or lastly to mixed and other secondary glaucomas.

In addition to discussion of the medical treatment five chapters are devoted to the surgery of glaucoma with adequate descriptions of operative technique.

Finally, there is a chapter on glaucoma clinics and educational programmes designed to ensure early diagnosis and to prevent the ravages of neglected glaucoma.

The book is well produced and is singularly free of error. Although it is easy to read and contains much information, one feels that this monograph is too highly priced.

STATISTICS FOR MEDICAL STUDENTS.

BERNSTEIN AND WEATHERALL have expanded their lecture notes to students about to do a course in physiology and pharmacology into a text-book, "Statistics for Medical and Other Biological Students".[1] Chapters are devoted to the scientific method, elementary probability, frequency distributions, sampling, regression and transformations. The analysis of variance and the associated design of experiment are then discussed, together with limitations of design imposed by moral considerations. The book is nicely illustrated by a number of graphs and will serve as a useful introduction to the statistics required in a modern course of physiology or pharmacology. This orientation has prevented the authors from giving a sufficiently detailed treatment of rates and ratios, the correct interpretation of which is still the main function of medical statistics. Nor is there any mention of demography, which is of increasing importance in the study of human environment and disease. In particular, it might be suggested that any text of medical statistics should have some discussion of the life table, which underlies any complete theory of prognosis and is important in other medical fields. Some criticism may be directed towards some loose statements, and two errors that have been made. On page 118 the restrictive clause "nor may it be used when n is small" is contrary to the general theory of R. A. Fisher, which the author has taken as a guide. On page 107 the rule for estimating the goodness of fit of a regression line is incorrectly stated.

BODY DYNAMICS.

"BODY DYNAMICS", by Eleanor Metheny,[2] professor of education and physical education in the University of Southern California, is a book written "for the general reader who is interested in improving his own physical efficiency. It deals with the problems of fitness in terms of the efficient expenditure of human energy to produce maximum results with minimum effort. Ways in which the physical conditions of the body can be improved by appropriate exercises are described and modern principles of posture, movement and relaxation for efficiency in work and play are discussed."

Throughout the work, although anatomical and physiological principles are always in mind, simple non-technical language is used. "The book is designed as a text-book for college students in general physical education classes." It might also be used as a text-book for all university students, and particularly for students of physiotherapy and for those medical students for whom courses in physical education are provided in the first year of their studies.

In an introductory chapter, the author quotes Plato, who said that "the most beautiful motion is that which accomplishes the greatest result with the least amount of effort". This is the underlying theme of the book, which can be recommended as a study of living anatomy and physiology.

There are chapters on the uses of exercise, exercise and relaxation, the balanced posture in standing, in walking and sitting, and an evaluation of balanced posture.

Of balanced posture, the author writes: "In evaluating the posture of any individual, the posture which is normal and right for A may be a position of strain for B."

The production of the book leaves nothing to be desired.

[1] "Statistics for Medical and Other Biological Students", by L. Bernstein, B.Sc., M.R.C.S., L.R.C.P., and M. Weatherall, M.A., D.M., B.Sc.; 1952. Edinburgh and London: E. and S. (Surgical) Proprietary, Limited. 9" × 6", pp. 469, with 123 Price: 18s. net.

[2] "Body Dynamics", by Eleanor Metheny, Ph.D.; First Edition; 1952. New York: McGraw-Hill Book Company, Incorporated. 9¼" × 6½", pp. 234, with 55 text figures.

FLUID BALANCE.

THE knowledge about the fluids of the body during health and illness is still relatively meagre, but enough is known to be of great use in the treatment of patients who have fluid and electrolyte imbalance. In "Fluid Balance"[1] Carl A. Moyer has attempted "to present a practical schema of diagnosis pertaining to fluid and electrolyte imbalances which can serve as a practical guide to the tentative selection of appropriate therapeutic measures". This is a small book, there are only about 160 pages of text, but it is so concentrated that it is very difficult to read it for any length of time. Good accounts are given of the electrolyte concentration of body fluids in health, and of the changes which may take place in disease and the means which may be employed to evaluate the changes and to correct them. The clinical signs associated with different kinds of electrolyte imbalance are considered in great detail. The author is a professor of surgery and the clinical aspects considered are concerned very largely with surgical patients. It is to be doubted whether the great detail of physical signs found in different conditions is altogether justified. For example, in "Electrolyte fluid volume deficit without significant changes in osmolar concentration" thirty different physical signs are given.

An excellent account of acidosis and alkalosis is given.

A large section of the book is taken up with case histories of patients with different kinds of imbalance, the treatment used and the results. The short summary at the end of the book may well be quoted. "Complexity and variability characterise the regulation of the internal fluid environment as they do everything concerning the living. Consequently, no fixed rules or schemes may be substituted for knowledge and for repeated total observation of the patient in supplying the needs of the sick for salt and water. An awareness of one's ignorance and the danger of too much, as well as too little, fluid, a pridelessness permitting the early self-recognition of judgement error, and a modicum of common sense are the prerequisites for the prescription or the withholding of fluids."

The book can be recommended to physicians and surgeons, particularly for reference.

Notes on Books, Current Journals and New Appliances.

THE "DIARY" OF A DOCTOR.

THE author of "Diary of a Doctor", Dr. "Peter", is one of those rare persons, a medical man with the gift of being able to present medical facts to the public in an attractive form.[2] He has been doing this through several media for many years. The present volume contains some of his choisest morsels. They consist of paragraphs, some in story form, which convey a medical lesson or correct a misconception in the popular mind. Subjects of all kinds are covered and even a hide-bound humourless practitioner (if there is such a person) cannot fail to be amused. Non-medical folk will be both amused and instructed. The book is divided into twelve chapters according to the month of the year. At the end of each chapter are half a dozen quotations or quips "from this month's reading". To quote one or two: "If those who are the enemies of innocent amusement had the direction of the world they would take away the spring and youth, the former from the year, the latter from human life." "Beauty is but skin dope." "*Penicillin Theme Song*: Will you love me when I'm mould?" "Heredity is something a father believes in, till his son

[1] "Fluid Balance: A Clinical Manual", by C. A. Moyer, M.D.; 1952. Chicago: The Year Book Publishers, Incorporated. 7" × 4¾", pp. 191. Price: $3.75.

[2] "Diary of a Doctor", by Dr. "Peter", M.B., Ch.M., with a foreword by Professor R. Douglas Wright; 1951. Melbourne: Robertson and Mullens, Limited. 9" × 5¾", pp. 176. Price: 10s.

begins to act like a damn fool." "Beware that the woman who strokes your hair isn't after your scalp." "The sophisticated woman might be described as one who had exchanged pigtails for cocktails." "The man who doesn't stand for something may eventually fall for anything." And so on. We wish this book good sale and many editions.

THE NATIONAL FORMULARY, 1952.

IN 1946 a Joint Formulary Committee, representative of the medical and pharmaceutical professions, was established in Great Britain to compile a prescriber's formulary. The first edition was published in 1949; a revision of this has now appeared.[1] As this formulary is intended for the use of practitioners in Great Britain there is no need to describe it in detail. At the same time it is an interesting production and will arouse the interest of those who think that a special formulary would be useful in the Commonwealth of Australia. The book is well produced and is published jointly by the British Medical Association and the Pharmaceutical Society of Great Britain.

PRACTICAL PROCEDURES.

THE second edition of "Practical Procedures", one of the "Practitioner's Handbooks", has appeared.[2] The popularity of this book is shown by the fact that, first published in 1938, it had to be reprinted four times. Edited by Sir Heneage Ogilvie and W. A. R. Thomson, it is the work of many contributors, all of whom hold appointments in British universities, hospitals or medical schools. It is an intensely practical book and supplies the practitioner with details of procedures which he may have to carry out at any time in his everyday work. There are 27 chapters and many illustrations. We can heartily recommend the book.

"GYPSONA TECHNIQUE."

"GYPSONA" bandages are prepared from plaster of Paris and are manufactured by T. J. Smith and Nephew, Limited, of Hull, England. "Gypsona Technique" is a small book[3] issued to the medical profession only in which fractures are discussed and directions are given for the preparation of splints from "Gypsona" bandages. This is the eighth edition; the first was published in 1935. It has 140 illustrations and should be useful to those who have to treat patients with fractures.

LECTURES IN MEDICINE.

THE fifth volume of "Edinburgh Post-Graduate Lectures in Medicine" has been published.[4] The lectures have been delivered and published under a grant received by the Executive Committee of the Edinburgh Post-Graduate Courses from the trustees of the late Mrs. Honyman Gillespie. There is one curious limitation imposed on the lectures by the testatrix—no lecture may be based on or have reference to animal experiment. The chairman, R. W. Johnstone, draws attention in the foreword to the fact that the limitation has had singularly little cramping effect on the committee or on lecturers. The lectures—there are 37 of them—cover a wide field and the lecturers are all (as they must be according to the conditions of the Trust) graduates of the University of Edinburgh. Those who know the earlier volumes will wish to have this one; others will make its acquaintance with advantage to themselves.

[1] "The National Formulary"; 1952. London: The British Medical Association. The Pharmaceutical Society of Great Britain. 7" x 4½", pp. 196. Price: 4s. 6d. Interleaved 7s. 6d.

[2] "Practical Procedures", edited by Heneage Ogilvie, K.B.E., D.M., M.Ch., F.R.C.S., and William A. R. Thomson, M.D.; Second Edition; 1952. Published on behalf of *The Practitioner*. London: Eyre and Spottiswoode. 9" x 6", pp. 280, with 99 illustrations. Price: 25s.

[3] "Gypsona Technique: A Handbook to the Functional Treatment of Fractures, with Sections on Plaster Treatment of Tuberculous Conditions, Soft-Tissue Injuries, Burns, etc."; Eighth Edition; 1950. Hull: T. J. Smith and Nephew, Limited. 8½" x 6", pp. 106, with 140 illustrations.

[4] "Edinburgh Post-Graduate Lectures in Medicine"; Volume V; 1952. Edinburgh: Oliver and Boyd. 10" x 6½", pp. 530, with about 150 illustrations. Price: 21s.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Textbook of Medicine for Nurses", by J. W. Joule, M.D., M.R.C.P.; 1952. London: H. K. Lewis and Company, Limited. 8½" x 6", pp. 516, with 48 illustrations. Price: 30s.

Written for the student nurse.

"Hygiene, Infectious Diseases and Dietetics", by Dennis H. Geffen, M.D., D.P.H., and Susan Tracy, M.R.C.S., L.R.C.P., D.P.H.; 1952. London: Longmans, Green and Company. 7½" x 5", pp. 284, with a few illustrations. Price: 16s.

Written primarily for nurses studying for their State Registered Nurses Certificate.

"Sodium Metabolism in Health and Disease", by Douglas A. K. Black, M.D., M.R.C.P.; 1952. Oxford: Blackwell Scientific Publications. 9" x 6", pp. 90, with four text figures. Price: 9s. 6d.

A critical review of work on sodium metabolism published up to the end of 1950.

"Massage and Remedial Exercises: In Medical and Surgical Conditions", by Noël M. Tidy, T.M.M.G.; Ninth Edition; 1952. Bristol: John Wright and Sons, Limited. 9" x 6", pp. 528, with 192 illustrations. Price: 27s. 6d.

Nine editions of this book have appeared in twenty years.

"Poisoning: A Guide to Clinical Diagnosis and Treatment", by W. F. von Oettingen, M.D., Ph.D.; 1952. New York: Paul B. Hoeber, Incorporated. 9½" x 6½", pp. 534. Price: $10.00.

The purpose of the book is "to organize today's knowledge of the subject in a fashion which will most readily aid the general practitioner and the internist in diagnosis and treatment of poisoning".

"Annual Epidemiological and Vital Statistics, 1939-1946. Part II: Cases of and Deaths from Notifiable Diseases"; 1952. Geneva: World Health Organization. 13" x 8½", pp. 202. Price: £1.

This publication follows on the *Annual Epidemiological Report* issued from 1923 to 1938 by the Health Organization of the League of Nations.

"The Control of Communicable Diseases", by Hugh Paul, M.D., D.P.H., with a foreword by G. S. Wilson, M.D., F.R.C.P., D.P.H.; 1952. London: Harvey and Blythe, Limited. 10" x 7½", pp. 536, with 30 text figures. Price: 55s.

Intended for public health doctors and for physicians, and especially for pædiatricians.

"International Sanitary Regulations: Proceedings of the Special Committee and of the Fourth World Health Assembly on WHO Regulations, Number 2"; 1952. Geneva: World Health Organization. 11½" x 8½", pp. 448. Price: 16s. 3d.

This is Number 37 of the "Official Records of the World Health Organization".

"Correction Tables for Radioactive Decay", by Barbara S. Smith; 1951. Bethesda 14, Maryland: Laboratory of Physical Biology, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health. 10½" x 8½", pp. 28.

This comes from the Federal Security Agency of the Public Health Service of the United States of America.

"Manual for the Microscopical Diagnosis of Malaria in Man", by Aimee Wilcox; Second Edition; 1950. Washington: United States Government Printing Office. 9½" x 6", pp. 84, with 16 plates, some in colour. Price: 40 cents.

This is a revised edition of the National Institute of Health Bulletin, Number 180, issued by the Public Health Service of the United States of America.

"Physical Medicine in General Practice", edited by William Bierman, M.D., and Sidney Licht, M.D.; Third Edition; 1952. New York: Paul B. Hoeber, Incorporated. 9½" x 6½", pp. 816, with 234 text figures. Price: $12.50.

Divided into two parts, dealing with methods and their clinical application.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 6, 1952.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE HAND.

THE hand is man's most readily available "instrument of precision"; it is indispensable to him in combat, and as a means of expressing his thoughts and sentiments he continually calls upon it. Sometimes he uses his hand in a purposeful and time-honoured fashion with obvious or with symbolic intent, and sometimes, without his being aware, his hands reveal what he has no intention of showing to the world. In fact we may paraphrase an old quotation and say: "By their hands shall ye know them." Types of hands have been described as characteristic of certain occupations or individuals. Often these descriptions are apt, but, as we all know, they may be misleading. We have known surgeons with podgy hands and short thick-set fingers which seemed quite unequal to the dexterous and delicate manipulations of the surgeon's art, and musicians of high rank whose hands looked more like those of a sailor used to handling his own craft than of an artist capable of giving musicianly interpretations at the keyboard. It may be of interest to consider the hand and what it can be trained to do, some of the symbolism that has been, and is, associated with it, and finally the hand in medicine.

Looked at from the anatomist's point of view, the hand has an intricate and delicate architecture. Careful dissection reveals a wealth of joints, synovial membranes and tendinous insertions that suggests not only prehensile strength but also a considerable variety of movements. The strength and most of the movements depend of course on the muscles of the forearm, on their innervation and on their healthy development; but without the elaborate structure of the hand itself nothing like an "instrument of precision" could be developed. Opposites are seen in the hand of the navvy and the hand of the professional pianist. But to be really effective both require development and practice—the acquisition and retention of fine movements such as a pianist uses are much the more difficult of the two. There comes to mind the story of the virtuoso pianist who said that if he failed to practise on one day he knew it when he played on the following day; if he neglected practice for two days the critics knew it; and if there was a gap of three days the public knew it. The acquisition of intricate and coordinated muscular movement is more difficult than its retention. We can recall activities other than piano playing to which this will apply—violin or violoncello playing, billiard playing (said to be the product of a mis-spent youth) and pick-pocketing. In regard to the last-mentioned, we do not know much of how the art is acquired, but have to presume the existence of such tuition as that ascribed to Fagin by Dickens in "Oliver Twist". It is not only in movements that the hand may be trained to excel, but in sensation such as that shown by a blind person reading braille and in kinæsthetic sense as shown by Helen Keller. Though it is not really germane to our subject, reference should perhaps be made at this point to the question of handedness. Interesting in regard to left-handedness is the relation of the phenomenon to stammering. In this regard it is generally held to be unwise to attempt the conversion of a left-handed into a right-handed child. Sometimes certain persons, surgeons, are said to be ambidexterous, but most of them have been described as ambisinisterous.

The symbolism of the hand is mentioned frequently in literature and is manifested in everyday life. Man himself is sometimes spoken of as a hand. A factory manager engages a dozen new hands—he engages twelve persons, not six. The common hand-shake is a form of greeting that may be perfunctory; it does show, however, a willingness to meet another on a friendly level. A man does not withhold his hand from another without just reason, and when he does there is no mistaking what he means. A hand clasp may be warm and a sign of pleasure and welcome, and in contrast there are those who for hand-shaking purposes have a cold and clammy appendage that feels like a dead fish. Such amorphous hand-shaking must surely point to some weakness in the donor's character. The right hand is the sign of power. In the Old Testament God shows his power by his right hand—David writes in Psalm XVII. "O thou that savest by thy right hand them which put their trust in thee." The hand it is, also, which sheds blood—Mark Antony cries over the dead body of Cæsar: "Woe to the hand that shed this costly blood." In everyday language we say that a man faces a new situation or undertakes a task with clean hands, and those whose hands are not clean may wish to make them clean. Pontius Pilate, condemning Jesus of Nazareth to be crucified, took water and washed his hands before the multitude, saying: "I am innocent of the blood of this just person, see ye to it." And Lady Macbeth, after the murder of Banquo, seeming to wash her hands, says: "Here's the smell of blood still: all the perfumes of Arabia will not sweeten this little hand." A man is said to ask for the hand of his beloved in marriage, and at the marriage ceremony they pledge their troth each to the other and declare it by the giving and receiving of a ring and by the joining of hands. It was not only in matrimony that the joining of hands symbolized unity. We find in "The Third Part of King Henry VI" the King addresses Warwick and Clarence: ". . . give me both your hands: Now join your hands, and with your hands your hearts, that no dissension hinder government." We may perhaps remember

that when Katharina "the shrew" was "tamed" she ended her appeal to the untamed with the words:

> Then vail your stomachs, for it is no boot,
> And place your hands below your husband's foot:
> In token of which duty, if he please,
> My hand is ready, may it do him ease.

The kissing of hands is a token of adoration and fealty and is redolent of the courtliness of days long passed. The kissing of hands at Court is mentioned in "As You Like It", but even to this day we occasionally read in the "Court Circular" in *The Times* that a highly placed official was received in audience by the Sovereign and "kissed hands" on relinquishing or taking up a certain appointment. The "laying on of hands" has been practised by the Church since apostolic times in such ceremonials as ordination and confirmation, and indeed we read of hands joined in prayer. Children who are taught to say their prayers are told to put their hands together. This is the characteristic attitude of prayer and it is superbly depicted in Albrecht Dürer's picture "The Praying Hands"—a picture which must surely appeal to the most uncomprehending. There are other gestures with hands that might be mentioned, such as the political salutes with the open hand and with the closed fist, but if these are mentioned we should not forget the inspired sign given by Mr. Churchill during the last war when he held his hand aloft giving the "V" sign for victory. One superstition in connexion with hands that should be mentioned is described by Frazer in "The Golden Bough" He states that warriors of the Theddora and Ngarigo tribes in south-eastern Australia used to eat the hands and feet of their slain enemies, believing that in this way they acquired some of the qualities and courage of the dead. The Dyaks of Sarawak also used to eat the palms and the flesh of the knees of the slain in order to steady their own hands and strengthen their own knees.

When we think of the hand in medicine we must confine ourselves to the hand of the doctor. To deal with the hand of the patient would call for a discussion on the many pathological conditions to which the hand may be subject —this is outside the scope of the present discussion. The doctor's hand may be considered actually and metaphorically. The doctor's hands are so important to him that he must care for them so that they will serve him in any emergency that may arise. It will not matter whether he has the short thick-set fingers mentioned earlier or the fingers of the artist. He must train his hand to the type of work it will have to do. In the early years of this century the use of indiarubber gloves by surgeons was introduced. Some men found it difficult to accustom themselves to the new conditions and for a while resistance was accompanied by talk about "the hand of iron in a glove of rubber". Opposition of course was short-lived and hands became accustomed to the covering of rubber and technical efficiency did not suffer. There are two reasons why a doctor should care for his hands. If he cares for them diligently he will not find it necessary to apply strong antiseptics to them and their skin will not become cracked and likely to pick up infections which will put him out of action for a while. Again, his tactile sense will probably be more acute in a hand that is not rough, and a well cared for hand will certainly be appreciated in clinical examination by patients of all ages in preference to a hand accustomed to all kinds of rough work. So much for the actual side; on the metaphorical side there is not much to be added. We have seen that the symbolism connected with hands covers a wide range. Of the doctor in this regard it may be said that he must come to his task with clean hands; with a high ethical background this will not be difficult. If he departs from his ethical standards no amount of Pilate-like washing will bring about a cleansing. He should be as one who has had a laying-on of hands by a high spiritual authority. There comes to mind an old German couplet which may be applicable here:

> *Rein die Hände, rein der Mund,*
> *Rein sei auch der Herzensgrund.*

The ethical background (a free translation for *Herzensgrund*) will produce words and works that are in every sense worthy of the profession which he should adorn and not merely belong to.

Current Comment.

EXOSTOSIS OF THE EXTERNAL AUDITORY MEATUS.

Exostosis of the external auditory meatus is relatively common, and it is much the most common tumour of the region. Its ætiology is elusive; enough is known to arouse interest without providing an explanation. One widely recognized fact is that it is commonly associated with swimming and especially diving, and this has been confirmed in the results of a *questionnaire* about the bathing habits of 8200 Air Force recruits. D. F. N. Harrison,[1] who conducted the investigation, states that of the 8200 recruits 4822 were regular swimmers, and of these 2942 were divers: 600 of the swimmers swam in fresh water, 674 in sea water and 3342 in public swimming baths. Although a far greater number of swimmers used the public baths than used the colder sea or river waters, it was amongst those of the latter group that the higher percentage of exostoses occurred. This, Harrison points out, seems to indicate that the temperature of the water may play a part in the production of exostoses. Examination of the whole group revealed 60 cases of exostosis. This is an incidence of only 0·7%, but the important point is that every recruit affected was a regular swimmer. There appeared to be no relationship between the presence of meatal exostosis and deafness. The majority of small early exostoses were found to arise from the anterior part of the floor of the deep bony meatus.

An interesting fact cited by Harrison from comparative anatomical studies is that in aquatic vertebrates the external meatus is protected by a flap or a valve, or it is merely a slit or minute passage. One can only speculate on the significance of this, but the entry of water into the meatus does seem to matter. In an attempt to throw light on this, Harrison conducted a series of experiments to discover if the presence of cold or warm water in the deep part of the meatus produced any change in the meatal walls. Twelve men had their ears irrigated with four ounces of tap water at 15° C. for fifteen seconds, and the duration of the reflex hyperæmia was recorded. Several days later the procedure was repeated with water at 40° C. Comparison of the respective duration of hyperæmia showed great prolongation of congestion after cold irrigation. The average duration of hyperæmia was forty-five minutes after cold irrigation and one minute after hot irrigation. Harrison states that experimental meatal exostosis has developed in a guinea-pig after prolonged water irrigation, and it is suggested that the prolonged vasodilatation that follows the presence of cold water is responsible for the microscopic changes that have been described. As a further experiment aimed at determining why some people develop exostoses and some do not, although all may have

[1] *Journal of Laryngology and Otology*, October, 1951.

swum under similar circumstances, the irrigation procedure was repeated with people who already possessed early exostoses. It was found that the "erythema duration" times following cold water irrigation not only exceeded those produced by warm water but far exceeded those recorded for people with a normal meatus, being eighty minutes and forty-five minutes respectively. It appears quite possible, then, that the prolonged reflex hyperæmia of the deep part of the meatus that follows cold water irrigation is at least a factor in the development of meatal exostoses. Moreover, although the reason is not clear, some would seem to be more susceptible than others. It may be as well for those with early exostoses to avoid the further aggravating effect of swimming and especially diving in very cold water.

ADDISON'S DISEASE IN THE NEGRO.

ANATOLE FRANCE prefaces a short but striking story about the three Magi by quoting Tertullian: "*Magos reges fere habuit Oriens*" (the East commonly held kings versed in magic). Balthasar of Ethiopia was "black, but comely in countenance", and in his adventures certainly learnt wisdom from the new star in the sky. Perhaps this digression from medicine may remind us that although pigmentation of the skin divides the world, it should not prevent the science and art of medicine from having universal application. Western medicine, though rooted in a culture spreading also eastward from the Mediterranean, has pursued its development apart from certain races, and this has been in some ways its loss. Here in Australia we are now becoming more aware of special maladies common in areas stretching from the Levant to the south-west Pacific. Medical visitors to America note, to their benefit, that a relevant point in a case history is whether the patient is white or "coloured", and have been interested to observe the apparent difference between the melanin pigmentation occurring as the result of disease and the natural pigmentation of the Negro. The same holds good with other pigmented races. Medical literature is still restricted in regard to observations made on our own aborigines. H. St. George Tucker, Isabel Taliaferro, Richard H. Kirkland and Robert Irby have published an article on Addison's disease in the Negro.[1] This disease was thought to be uncommon in the Negro, but these authors think that the 31 reported cases by no means represent the true incidence of the condition. It has been generally agreed that the paucity of reports is probably due to the difficulty of recognizing pigmentary changes in dark skin. Tucker and his associates managed to discover another six cases. The case histories describe the usual symptoms of progressive weakness, loss of weight, arterial hypotension and intolerance of salt-deprivation. Biopsy of the skin showed intense melanin pigmentation, but except for this excess of pigment the microscopic appearance was that of normal Negro skin. Treatment by supplementary salt ration gave some relief, and cortisone and DOCA were used. The implantation of DOCA pellets was a satisfactory maintenance method, but the onset of relative hypertension and œdema in one patient necessitated the removal of some of the pellets. The clinical and biochemical findings differed in no respect from those familiar in the white races, but there were certain interesting features in the pigmentation. In some cases the skin appeared quite black all over, but it was most intense on the face, the backs of the hands, the feet, elbows and knees. Photographs show how strikingly the colour had been intensified. Patches of pigmentation on the lips, gums, palate and mouth were practically always present, but Tucker and his colleagues remark that such pigmented areas are common in healthy Negroes. It would seem that in members of the very darkly pigmented races diagnosis may be unassisted by inspection. Indeed, Tucker *et alii* state that the pigmentary changes are not specific for Addison's disease; they are rather "an intensification of melanin pigmentation along a pattern that is inherent in the race". Yet it should be remembered that what we see with the unaided eye does not necessarily correspond with microscopic appearance. Certain qualitative differences in the visual effects of pigment may be described, and may be useful in clinical observation. An everyday example in the fallacious appearance of pigmented structures is found in the obvious difference between the blue and the brown iris of the eye; unaided vision does not perceive that this difference is really quantitative only.

During the war medical officers occasionally had the opportunity to see atebrin pigmentation in dark-skinned men; this type of pigmentation seemed to have some qualitative differences from that usually seen in whites, but it appeared that even these were relative only, as the apparently aberrant changes were occasionally seen also in white subjects. It is not irrelevant to point out here that one patient mentioned by Tucker *et alii* lost a striking amount of pigment after treatment with cortisone. In conclusion it is suggested that Addison's disease may show the same incidence rate in Negroes as in whites. Although there are certain racial peculiarities in the clinical manifestations of disease and in susceptibility to various morbid processes, perhaps closer study will show that the general patterns conform more closely than mere inspection would suggest. Balthasar in strength, in weakness and in wisdom was one with the other Magi.

[1] *The American Journal of the Medical Sciences*, May, 1952.

COUGHING IRON LUNG.

THAT any apparatus devised to produce artificial respiration should simulate natural breathing well enough to keep the body alive not merely for hours but for days is in itself a remarkable achievement. J. S. Haldane and his school demonstrated that the regulation of respiration by the partial pressure of carbon dioxide in the medulla is a most delicately controlled reaction; even an increase of one quarter of an atmosphere partial pressure of carbon dioxide in the blood entering the medulla can produce a doubling of the respiratory volume. Respiration can, in fact, be regarded as the fine adjustment of the regulation of hydrogen-ion concentration. If more carbon dioxide is removed than suffices to maintain a certain standard —somewhere about 5% of an atmosphere—a condition of alkalosis supervenes, and though there are extra-respiratory mechanisms which can counteract the effects of hyperpnœa, yet considerable damage can be done by over-ventilation. One disability of all iron lungs hitherto invented has been the absence of that natural ejection of phlegm we call coughing. It is easy for mucus to pile up and in all truth drown the patient in his own respiratory secretions. The idea of the coughing iron lung[1] originated with Dr. Alvan L. Barach, of Columbia University, who initiated the constructive work. A unit was set up at Willard Parker Hospital, and operators were trained in its use. The first medical use of the coughing iron lung was in October, 1950, when it saved the life of a girl suffering from bulbar poliomyelitis. The National Foundation for Infantile Paralysis has granted the Engineering Research Division a contract for the design and construction of an improved, all-purpose, mechanical respirator embodying the cough chamber feature. Briefly the method is this. The coughing lung consists of two pressure sections, a head section and a chest section, separated by a wall containing a small hole. The chamber is "pressurized" from the head end. After a few seconds both sections are in equilibrium at a pressure greater than the atmospheric. Then the air in the head end is allowed to escape quickly, and so the pressure on the chest section gives a rapidly developed and temporary compression of the thorax which empties the lungs or at least the bronchi. It is interesting to note that this new coughing lung will be made in transparent plastic to relieve the patient's sensation of claustrophobia.

[1] *Journal of the Franklin Institute*, June, 1952.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Prophylaxis of Experimental Diphtheria with Penicillin.

J. P. USCAVAGE, M. NOVAK AND W. I. TAYLOR (*The Journal of Infectious Diseases*, September-October, 1951) studied the prophylaxis of experimental diphtheria with penicillin. They state that in view of the known sensitivity of guinea-pigs to experimental infection, and the high therapeutic levels of penicillin now possible with a single dose of procaine penicillin, they decided to make a detailed study of the subject. They used a standard dose of *Corynebacterium diphtheriæ*, whose penicillin-sensitivity was carefully estimated, and which did not grow in the presence of 50 units of penicillin per millilitre of medium. Groups of mice were given intraperitoneal injections of 300 and 150 units of penicillin, and the dose of organisms was administered at varying periods of time afterwards; one group of mice received only one injection, one group received two, and one group of mice was also given antitoxin. It was found that if penicillin was given within three hours of the infecting organisms, there was a significant reduction in mortality, and the time of survival was lengthened. Antitoxin alone reduced the mortality if given prophylactically, but it did not prolong the life of the animal if given after infection.

A Combined Yellow Fever-Smallpox Vaccine for Cutaneous Application.

R. G. HAHN (*The American Journal of Hygiene*, July, 1951) has studied a combined yellow fever-smallpox vaccine for cutaneous application. The 17D strain of yellow fever virus was grown in seven-day chick embryos for four days, and then the embryos were harvested, ground and freeze-dried in small amounts. Vaccinia virus was also prepared from standardized sheep lymph which had been phenolized. The final product was composed of homogenized yellow fever egg material, mixed with specially prepared gum arabic solution combined with the phenolized vaccinia lymph in a proportion of 5:1, and freeze-dried. The yellow fever component of the product was tested alone on human volunteers and monkeys, and the final mixed product was tested by protection tests with serum from persons inoculated by a scratch method. It was found that in groups of people numbering 68 there was a 95% positive result three months later. Experiments showed that the material remained satisfactorily potent up to sixteen months after its preparation. The author believes that this is a cheap and efficient method of immunization against both diseases and that it could be applied to native populations.

The Cellular Immunology of Acute Bacteriæmia.

W. BARRY WOOD, JUNIOR, MARY RUTH SMITH, W. D. PERRY AND J. W. BERRY (*The Journal of Experimental Medicine*, December 1, 1951) initiated a study on the cellular immunology of acute bacteriæmia by observing the intravascular leucocytic reaction and surface phagocytosis. Their aim was to examine the processes early in an intravascular infection before the development of antibodies could take part in the opsonization of fully encapsulated bacteria. They used a modification of the rabbit's ear chamber and also the mesoappendix capillary technique. Organisms used were pneumococcus type I and Friedländer's bacillus strain Chic. The authors state that the first change after the introduction of large numbers of bacteria into the bloodstream was a sticking of the leucocytes to the endothelium of capillaries, arterioles and venules, the leucocytes becoming motile and potentially phagocytic, and they were observed to ingest fully capsulated organisms at a time when no antibody could be demonstrated. It is possible that intravascular "fibrin" is deposited and helps to trap the bacteria. It is concluded that this method of phagocytosis aids the phagocytic activity of reticulo-endothelial tissues and is an important defence mechanism in the host before antibodies can play a part in acute infection complicated by bacteriæmia.

Experimental Brucellosis.

ABRAHAM I. BRAUDE (*The Journal of Infectious Diseases*, July-August, 1951) began studies in the pathology and pathogenesis of experimental brucellosis by making a comparison of the pathogenicity of *Brucella abortus*, *Brucella melitensis* and *Brucella suis* for guinea-pigs. Six smooth strains of each variety were used, almost all being isolated from patients, and male guinea-pigs were inoculated intraperitoneally with approximately 500,000 cells from a young culture grown on tryptose agar and carefully standardized. The animals were observed for one hundred and thirty days, bled and then sacrificed, and post-mortem studies were made. Of animals infected with *B suis*, one died before the end of the experiment, and abscesses were present in varying situations in every animal. Three animals infected with *B. melitensis* died, and half the animals had abscesses; the disease in these animals, however, had a more severe clinical course than in the pigs infected with *B. suis*. One animal with B. *abortus* infection died, the other animals appeared healthy and gained weight, and only one strain produced abscesses. Splenic enlargement was more conspicuous in this group than in either of the other two, and a small non-suppurative lesion resembling a granuloma was common.

Aschoff Bodies from Injured Myofibres.

GEORGE E. MURPHY (*The Journal of Experimental Medicine*, March, 1952) has assembled evidence that Aschoff bodies of rheumatic myocarditis develop from injured myofibres. A few amongst very many rabbits repeatedly infected with group A streptococci showed the production of myocardial Aschoff bodies; as well, autopsy material was available from several human subjects who had succumbed to rheumatic fever. The author states that careful histopathological studies indicate that these lesions originate in heart muscle fibres, and part of the cellular reaction may begin beneath the sarcolemma, and not in the collagen adjacent. Careful observation may show regeneration of the fibres in some instances. The author believes that the finding of these lesions in a very few of many animals infected, and the fact that the infections were focal and caused by different serological types of streptococci, should be emphasized, since this also supports the clinical fact that of many patients repeatedly infected with hæmolytic streptococci, only a small number develop rheumatic myocarditis.

Absence of Prosthetic Group in Type-Specific Polysaccharide of Pneumococcus.

M. HEIDELBERGER, C. M. MACLEOD, H. MARKOWITZ AND MARIE DILAPI (*The Journal of Experimental Medicine*, November, 1951) have devised experiments to demonstrate the absence of a prosthetic group in a type-specific polysaccharide of pneumococcus. The substance was prepared from type III cultures by alcohol precipitation after treatment with sodium acetate, and was then purified; and a portion on analysis was found to contain 0·05% of nitrogen and 0·01% of phosphorus. It was tested for its ability to precipitate antibody from immune rabbit serum by a quantitative method, and the purified substance precipitated almost exactly the same amount as the portion of the original sample from which it was prepared. The purified substance was injected into human volunteers, and their serum was collected two months later. The amounts of antibody nitrogen in four millilitres of serum were calculated and compared with the figures obtained from sera produced in response to antigens containing ten times the amount of nitrogen. There did not appear from this work any evidence that a prosthetic group is concerned in the immunological characters of type III pneumococcus polysaccharide.

Prophylaxis of German Measles.

ROBERT F. KORNS (*The Journal of Infectious Diseases*, March-April, 1952) has made an examination of the prophylaxis of German measles with immune serum globulin. The study was made at Rome State School, New York State, where 4113 mentally defective persons at risk had developed 410 cases of the disease, outbreaks occurring in various buildings housing separate groups of people. Convalescent patients were removed from the group, which was then divided by giving alternate patients 0·1 millilitre of globulin per pound of body weight, care being taken to have equal numbers in different age groups of control and immunized subjects. Three different batches of globulin obtained from the Red Cross were used; so far as possible they had been stored under satisfactory conditions, and measurable qualities, such as diphtheria antitoxin and typhoid agglutinin content, were unchanged over the period of storage. Careful analysis of the results showed that one batch of globulin made no difference whatever to the incidence of the disease in control and treated groups; the second batch appeared to lower the incidence slightly amongst the protected patients; the third batch was effective, only nine of 45 immunized subjects developing a mild attack of German measles, while 35 of 60 untreated persons developed the characteristic disease. The author discusses the difficulty of estimating the potency of globulin against German measles, and the usefulness of including

serum from patients convalescent from the disease in pools for the preparation of globulin.

HYGIENE.

Pulmonary Talcosis.

W. E. JAQUES AND K. BENIRSCHKE (*Archives of Industrial Hygiene and Occupational Medicine*, May, 1952) report a case of talc pneumonokoniosis with a description of the clinical signs and symptoms and pathological findings. The report refers to a man, aged forty-two years, who died eight hours after admission to hospital with increasing dyspnœa and cardiac failure. Eight years prior to his death he had completed sixteen years in a shoe factory, where he had cut out shoe linings. These were usually covered with abundant talcum powder. At the post-mortem examination extensive pulmonary fibrosis and granulomatosis were found. Talc crystals were positively identified in lung sections. Cardiac and gastric lesions were present and were interpreted to represent a direct reaction to talc or an altered capacity to react on the part of the host. A review of the available literature is presented.

A Conservation of Hearing Programme for School Children.

C. HAYMAN, B. RICH AND E. STARK (*American Journal of Public Health and The Nation's Health*, December, 1951) review three years' work in connexion with a programme to investigate and to conserve the hearing of school children in Harford County, Maryland, United States of America. They state that since February, 1948, 70% of the children in the Harford County schools have been screened for hearing defects by audiometry. Of 7000 children tested, 1018 (14%) failed in the test; 941 of these were first examined in the clinic, and 54 others were referred for examination, mainly through teacher-nurse conferences. The majority of 995 clinic patients had mild loss of hearing; but 7·6% had severe or extreme loss when first examined. Chronic conduction deafness was found in 712 cases (72%), nearly always associated with previous upper respiratory tract infections. Partial obstruction of the Eustachian tubes from infected tonsils and adenoids was present in 535 cases, and from infected adenoids alone in 132 cases. Nerve deafness was found in 33 cases; in 12 of these the patient also had conduction deafness. One hundred and ninety operations for the removal of tonsils and adenoids were performed—36% of the number recommended; 139 children received radium treatment—94% of those recommended. Of patients on whom the operation was performed on the authors' recommendation, 69% obtained improvement in hearing. In a similar group who did not have the operation as recommended, only 33% obtained improvement. Hearing became worse in 2·6% of patients after the operation, in contrast to 20·9% among those who declined. Of those patients treated with radium, 54% obtained improvement of hearing. No control group of untreated patients has ever been available for comparison. Such a comparison is still needed. Improvement in hearing (as well as regression) was similar for younger and older children, with and without treatment. This finding was not as expected, since it was believed that the hearing of the older children would improve spontaneously as the adenoid tissue shrank. This points to the necessity of carrying out treatment, rather than waiting.

Parenteral Injections and Poliomyelitis.

R. F. KORNS, R. M. ALBRECHT AND F. B. LOCKE (*American Journal of Public Health and The Nation's Health*, February, 1952) have investigated the association between injections and the incidence of poliomyelitis in New York State during 1950. Information on previous injections was collected from a group of 2137 poliomyelitis patients, 6055 other members of the patients' households, and 14,710 other control individuals from adjacent households. The results obtained indicated that the percentage of patients with a history of immunizing injections, penicillin injections or a miscellaneous group of other injections during the two months before onset was twice that found during the same period in the control population of similar age. The excess of injections among patients as compared to controls was present throughout the two-month period. A positive correlation was demonstrated between the site of paralysis and site of injection. Paralysis in patients tended to be slightly more severe in those who had had injections than in those who had had no injections. From the tables it appears that 4·86% of the poliomyelitis patients had some form of immunizing injection, 5·94% had penicillin injections and 2·75% had some other type of injection. Tabulation of the types of immunizing agents indicates that 65% of the injections given during the two-month period to poliomyelitis patients were of combined diphtheria-pertussis-tetanus vaccine. Smallpox vaccinations accounted for 12%. The remainder consisted largely of combined diphtheria-tetanus toxoid injections.

Carcinoma of the Lung in Chromate Workers.

P. L. BIDSTRUP (*British Journal of Industrial Medicine*, October, 1951) reviews the literature on carcinoma of the respiratory system in persons exposed at work to chromates and reports the results of an investigation of workers employed in three factories making basic chromates from the ore chromite in Great Britain. The processing of chromate is briefly described. One case of pulmonary carcinoma was found on examination by mass radiography of 724 workmen. The total number of workmen exposed to chromates in the chromate-producing industry was not more than 765 at the time of the survey. The findings were compared with the incidence of intrathoracic newgrowths among men in the general population in Great Britain obtained by mass radiography units in 1949, and with the death rates from lung cancer at different ages as given by the Registrar-General for 1948. The author states that if the incidence among those in the group surveyed had been similar, the number of cases of intrathoracic malignancy would have been 0·41; actually one case was found among those in the exposed group. It is not considered possible to assess from this investigation the true incidence of carcinoma of the respiratory system among workmen in the chromate-producing industry in Great Britain, but the results suggest to the author that the crude death rate is unlikely to be as great as 25 times the normal. Since it is possible that there is some increase in the incidence of carcinoma of the lung in workmen in this industry in Great Britain, an attempt is being made to follow for a further period of two years the health of men who took part in the investigation in 1949.

Production of Lung Shadows by Industrial Dusts: Zircon.

H. HARDING AND T. LLOYD DAVIES (*British Journal of Industrial Medicine*, January, 1952) report the results of animal experiments to determine the effects of the inhalation of zircon. Dense radiological shadows were produced in the lungs by aggregates of phagocytes containing zircon. The authors state that apart from phagocytosis, and possibly slight small cell accumulation, there is no evident reaction to the presence of zircon in the lungs of rats. Since zircon is far less toxic than silica (and possibly completely inert), and since animal experiments suggest that it is less readily inhaled into and/or retained in the lungs than the latter, it could provide a desirable substitute for silica. The use of silica as a parting powder is prohibited in foundries in England, and zircon is one of the permitted substances. The authors suggest that it could also be used as a substitute for silica in other industrial operations, even if its use required modification of industrial techniques at present in use.

Rheumatism in Miners.

J. LAWRENCE AND J. AITKEN-SWAN (*British Journal of Industrial Medicine*, January, 1952) investigated the incidence of rheumatic complaints in miners. A medium-sized colliery, employing approximately 1000 men and situated in the Manchester coalfields in England, was chosen for the investigation. The field survey was arranged to include control groups of non-mining males and of females from mining and non-mining families. The gross incidence of rheumatic complaints was not found to be appreciably different in miners and non-miners, but there was evidence of an earlier onset in miners, as shown by a higher incidence in the fourth decade. The miners' statements indicated that they lost more working time from rheumatic complaints than did non-miners. Rheumatic pain in miners was chiefly in the lumbar and sciatic distribution, and pain in these sites largely accounted for the increased incidence of rheumatic complaints in the fourth decade and for the increased loss of working time among miners. Miners also had an increased incidence of knee pain. Tentative diagnoses made in the field indicated that the lumbar sciatic pain might frequently result from disorders of the intervertebral disks. There was also evidence of an increased incidence of osteoarthritis among the miners. A study of invaliding records showed that invaliding from the mines was due most commonly to chest conditions; rheumatism came second in importance. Those invalided for rheumatism complained chiefly of low-back sciatic pain. The incidence of rheumatic complaints in members of miners' families was lower than in the general population and considerably lower than in the miners themselves.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

XXXVI.

THE MANAGEMENT OF TOXÆMIA OF PREGNANCY.

PART I: THE ASSESSMENT.

BEFORE we speak of management it is logical to ask: "What is the problem?" (i) The *primigravida* with preeclampsia is the common problem. (ii) The patient with chronic hypertension is less common but not rare. (iii) Eclampsia should not occur (except in the most isolated "fulminating" case). (iv) Chronic nephritis in a pregnant woman is extremely rare. The problem here will be mainly a difficulty in its diagnosis and usually in its exclusion.

From a practical everyday point of view, therefore, it will be a problem of: (i) preeclampsia; (ii) chronic hypertension; (iii) a combination of these two conditions, namely, chronic hypertension complicated later by preeclampsia.

Time Incidence in Pregnancy.

If we exclude the toxæmia which sometimes complicates a hydatidiform mole (and it may be an intensely severe one), preeclampsia is typically a disease of the last twelve weeks of pregnancy. Chronic hypertension is a disease of the first twelve weeks (at least in respect of its earliest detection). Finally there are not infrequent cases in which chronic hypertension is complicated in the last twelve weeks by preeclampsia.

The diagnosis of this superimposed condition is not as a rule difficult. The woman is carrying a symptomless rise of blood pressure, feeling well and perhaps wondering "what all the fuss is about". Then somewhere in the last twelve weeks the picture changes; her face becomes puffy and her wedding ring tight, and albumin appears in the urine.

In other cases the diagnosis is more difficult. Without any obvious œdema you may find an occasional trace or cloud of albumin in the urine. Here the thought of nephritis passes through your mind. From the point of view of management, however, this should not introduce an added difficulty, because delivery of the baby at the age of viability (thirty-six weeks) is desirable whether the added complication is preeclampsia or nephritis.

Assessment of the Signs.

Weight.

The text which I give my students is: "Weight is water." By this one means, of course, excessive increase in weight. One or two people have queried the significance of an excessive increase in weight. Undoubtedly there are some who increase their weight above the standard amount (one pound per week or four pounds per month), and yet do not develop a rise in blood pressure or albuminuria.

There may be, furthermore, a greater significance in a sudden increase, but wherever the truth may lie in the interpretation of this sign, it is wise to weigh your patient regularly.

There is rarely any difficulty in interesting a woman in her weight; the measurement of her weight is therefore a useful link in the chain of her cooperation. Furthermore by the early detection of an excessive increase in weight, implying immediate modification of her diet, you will at least postpone the development of other signs (rise of blood pressure and albuminuria).

And even if you should "diet" the occasional patient when the weight increase carries no toxæmic significance, it at least does no harm.

Œdema.

It is appropriate to move from weight gain to discuss œdema.

Œdema is a very important element in toxæmia because: (*a*) it is insidious in its onset; (*b*) it interferes with function.

It is insidious in its onset because by the time it is clinically detectable it is gross in degree. It is difficult to say how much fluid the tissues can retain before it is detectable by clinical examination. But it is, without doubt, a fact that our clinical tests for œdema are crude in the extreme. "Pitting" around the ankles, a tight wedding ring, a puffy face, are signs, not of the onset, but of well-established œdema, and when we recognize that the œdema of toxæmia is not merely an external manifestation, but a generalized and therefore internal condition as well, it is not difficult to appreciate its significance. Herein lies the importance of the excessive weight gain—"weight is water".

Œdema interferes with function. An analogy is hardly necessary, but even to a lay person the fact is obvious that a swollen finger cannot work properly. What is not so obvious, however, is that a swollen (œdematous) kidney, liver or brain cannot function properly, and this impaired function may carry serious results for the human machine. Especially is this so when œdema occurs inside the inelastic fibrous capsule of the kidney or the bony case of the brain. In these sites œdema will cause ischæmia with deficient oxygenation of delicate tissue. In the kidney capillary walls break and "leak" albumin and red cells; glomeruli and tubules suffer, and the renal function is difficult and may be endangered. Add to œdema the spasm of the afferent arterioles to the glomeruli which occurs with hypertension, and you have a really sick kidney. The pity of it is that a wounded kidney does not complain—or at any rate not until it is *in extremis*. Then its expression takes the form of a raised blood urea content (over 30 milligrammes *per centum*); but renal tests are so insensitive that by the time biochemistry comes to your aid, the clinical condition of the patient has declared the severity of the renal failure.

There is one test of function, however, that may not always receive sufficient attention. And yet it is the most obvious function of the kidney—the passing of water.

We should watch carefully the amount of urine excreted daily. This is so elementary that I feel hesitant about mentioning it, but I wonder if sometimes on our daily tour of duty we do not look only at the albumin and forget the water. A column on the chart for the twenty-four hours' output of urine is essential.

The Blood Pressure.

As a sign of toxæmia a rise of blood pressure as a rule follows an excessive weight gain within the next few weeks. That, of course, is well recognized, but there are two facts about the rise that may not always be recognized for their real value: (i) the standard of normality in a pregnant woman; (ii) the "relativity of the blood pressure".

(i) The normal or average blood pressure levels must be revised when you move from the non-pregnant to the pregnant woman. An eminent physician recently described a woman of fifty-eight years with moderately raised blood pressure. The systolic pressure was 180 and the diastolic pressure 120 millimetres of mercury. But that is in the non-pregnant. Such a blood pressure in a pregnant woman would have us sorely worried. We would be watching for eclampsia in a preeclamptic or for albumin and fœtal death in a patient with chronic hypertension. One fact is sure, that 120 millimetres of mercury, systolic, and 80 millimetres, diastolic, are the upper limits of normality we can accept in a pregnant woman if we are to come anywhere near success in our management of toxæmias.

(ii) The importance of the "relativity of the blood pressure" has been stressed by T. Dixon Hughes in a contribution to THE MEDICAL JOURNAL OF AUSTRALIA, December 29, 1951, page 871. If you have not read it, I recommend it to your consideration. It describes an intensive campaign against the occurrence of eclampsia at the Women's Hospital, Crown Street, Sydney. It produced an amazing result. "The keystone on which this work was based"—to quote Dr. Dixon Hughes—"was the relationship of a patient's blood pressure at the time to that of the particular patient at the commencement of her pregnancy."

His graphs clearly demonstrate his point, namely, that a woman whose blood pressure has risen from 105 to 130 millimetres of mercury (a rise of 25 points) is, toxæmically speaking, worse than one whose pressure has climbed from 130 to 140 millimetres (a rise of only 10 points). This was borne out by the factual clinical observation that it was often "the young *primigravida* with an initial low blood pressure who provided the majority of the so-called fulminating cases".

Another important aspect of blood pressure is a rise at the woman's first visit to the doctor. F. J. Browne has emphasized the significance of this interesting feature. We all remember how in medical examination of recruits for the services we frequently found a recruit's blood pressure above the figure laid down by regulation as acceptable, and how, after rest or return the following day, the pressure had

subsided; nervousness was the explanation. In recruits that may be acceptable, but in a pregnant woman, as Browne suggests, we cannot disregard this hypertensive potentiality. I have confirmed this in my own patients, and have frequently found that a blood pressure "that is nothing to worry about" (135 to 140 millimetres of mercury, systolic) will become higher and more permanently established as the pregnancy moves into its third trimester.

Albuminuria.

Two aspects of albuminuria merit special regard: (i) the catheter specimen, (ii) albuminuria without any other sign.

(i) The catheter specimen. When the amount of albumin is considerable, such as a quarter or more in the test tube by the heat-coagulation test, there is little doubt that with an accompanying rise of blood pressure it is of toxæmic origin. But when it is merely a "trace" or a "cloud" it may be due to other causes. It is essential to examine a catheter specimen. (Actually, in practice I would have at least one catheter specimen examined as a routine investigation of any woman who had been admitted to hospital, because I would want a microscopic examination and culture.)

(ii) Albuminuria without any other sign. Persistent albuminuria in the absence of a rise of blood pressure and œdema can be one of the most perplexing problems you will meet in obstetrics.

These are the conditions to be kept in mind in such a case: contamination by vaginal discharge, toxæmia, nephritis, cystitis and pyelitis, calculus, renal or vesical newgrowth. The investigation would include: examination of a catheter specimen, microscopic examination for pus and culture of organisms, excretion pyelography, performance of blood urea and urea concentration tests, cystoscopy (on occasion).

If there is no other evidence of toxæmia, and if cystitis, pyelitis, calculus and newgrowth can be ruled out, one imagines that the patient is "leaking" albumin through damaged glomeruli and the only conclusion one can see is "nephritis". This can then be a very difficult problem in management.

I recall such a case two years ago in which the albumin was a "trace" only from eight weeks onwards. The woman was young (twenty-two years) and albuminuria was the only finding. If the conclusion at eight weeks of nephritis was correct (based on the merest trace of albumin), then the outlook was bad. And this conclusion was the result of much investigation and consultation with the physician and ophthalmologist. The investigations gave strong negative results. Nephritis, yes, but she felt and looked so well that one could not suggest any course other than that she continue with the pregnancy—which she was anxious to do. It proved to be a most troublesome story. Although she was rested in hospital from early days, without any increase in albuminuria for twenty-eight weeks, deterioration thereafter came rapidly, and by thirty-two weeks she showed "solid albumin", her blood urea content rose and her renal function fell. Induction failed and a Cæsarean section was performed.

The baby lived (*mirabile dictu*) and so did the mother, but only after ten weeks' post-operative turmoil complicated by multiple thromboses, pulmonary, pelvic and femoral.

Her albumin today is still copious, and although in spirit she is a joy to behold with her bonny baby, she is far from well, and I fear that the child may not have the guidance of her mother for very many years.

PART II: THE MANAGEMENT.

The management need not be specified in relation to the particular variety of toxæmia, because the same principles apply. They are: rest, diet, the use of sedatives, the use of magnesium sulphate, intravenous administration of glucose, the use of mercurial diuretics, delivery.

Rest.

Rest is an unimpressive prescription, but it is valuable and effective. There are two values of rest which may not be commonly recognized: diuretic and educational.

Rest is a diuretic. The kidneys seem to excrete better when the woman is off her feet. Perhaps there is a better blood supply to the kidneys when a lesser demand is made on the circulation. Walking and working muscles have to be more freely oxygenated. Other organs reap the benefit of these muscles at rest. Perhaps decreased intraabdominal pressure is a factor.

Rest is educational. One means by this that the word "rest" is always a relative term, and the average active person has little idea of what medical rest means. If you put a patient with chronic hypertension or preeclampsia to bed in hospital for a week or two very "early in the piece", it often has the effect of slowing up the mental directive as it were. It puts the machine into low gear, and later, when the patient returns home, it stays in low gear for the rest of the journey.

I recall a woman with chronic hypertension who married at forty years of age and became pregnant. She had led an intensely busy nursing life for many years. When rest was suggested as essential if she were to carry through, she replied that she could really do it at home. After all, she had been a nurse and knew what it meant. Two weeks' rest at home had no effect on the blood pressure, and so to hospital she came. Now the weeds in the garden got a chance to grow and the fluff a chance to collect under the furniture at home. And the blood pressure came down. Thereafter it was easy. "I don't seem to have the energy to do a thing now, doctor", she told me half-way through the pregnancy. "You've made me thoroughly lazy!" Rest is hard work for an active mind which has to be educated down to it.

Diet.

The aim of diet in any case of hypertension and for any pregnant woman who has exceeded the four pounds a month limit is to counter œdema. This is done by restricting the intake of sodium by reducing the salt in the diet. In the earliest stage of the treatment (in the early months of chronic hypertension and at the first excessive weight gain in preeclampsia) I order the diet recommended at the outset for normal pregnancy and delete most of the tasty items. Here they are: bacon, baked beans, beef (corned or salt), dates and dried fruits, gravy, ham, meat extracts, olives, pickles, salt or smoked fish, salt-water fish and sausages. There must be no addition of salt to vegetables or other cooked foods, no salt from the shaker, and finally we must watch carefully any prescription containing sodium.

Sedatives.

There is little to say on the score of sedatives except to stress the necessity for them. My routine is to give phenobarbital, a quarter of a grain, twice or three times a day when the treatment is carried out at home. Sometimes something is necessary at night.

When the patient is admitted to hospital and more and stronger sedatives become necessary, I give one grain of phenobarbital three times a day with one and a half grains of pentobarbital sodium (one or two tablets at night) and 10 grains of chloral hydrate in the morning. If the condition becomes really severe then I give alternatively every six hours three grains of pentobarbital sodium by mouth and five millilitres of paraldehyde intramuscularly.

If vomiting should be a bar to oral administration, a hypodermic injection of soluble phenobarbital (three grains) is most useful in the mild to moderate case. It can be repeated every four hours if necessary. In the more severe case the intramuscular injection of paraldehyde is required.

The Use of Magnesium Sulphate.

Over the past three years we have used a great deal of magnesium sulphate by the intramuscular route. The dose is eight millilitres of 50% magnesium sulphate solution by intramuscular injection to start with, and four millilitres every four hours till 32 millilitres have been given or the blood pressure falls below 140 millimetres of mercury, systolic, and 90, diastolic. In quite a number of cases it seems to bring the systolic blood pressure down to a level (140 millimetres) at which one feels much happier, and which allows the woman to carry on with greater safety to herself and the baby.

The figure of 160 millimetres, systolic, has been suggested by F. J. Browne as the upper limit of safety. I cannot say that my own observations have led me to regard this figure with a fear equal to Browne's. In a case of chronic hypertension I would carry the woman on towards fœtal viability with her systolic blood pressure up to 180 millimetres, provided there was no albumin present, and provided, of course, that she was in bed in hospital.

"Veratrone" has been practically discarded. Hexamethonium bromide has had too little use as yet to allow of an opinion on its safety or effectiveness.

Intravenous Administration of Concentrated Glucose.

Over the past five years I have used much less concentrated glucose. It is still useful and can be employed when you desire to produce diuresis. My technique has

changed. Previously I gave 500 millilitres in distilled water every twelve hours and gave it quickly—in twenty minutes. The question was occasionally raised of the possibility of producing pulmonary œdema in an already œdematous patient. I have knowledge of only two patients in whom pulmonary œdema followed the intravenous administration of glucose. They were both women who were given a litre at a time. It was following these experiences that the dose was reduced to 500 millilitres.

My routine at present, however, is to give glucose in 50% solution by a syringe intravenously, giving 20 millilitres every two hours for twenty-four hours. This should accomplish the "boosting" of the blood sugar level and diuresis without the risk of introducing too much fluid. The disadvantage is occasional thrombosis at the site of injection.

Mercurial Diuretics.

As obstetricians we have always been conservative about giving a heavy metal like mercury to a pregnant woman whose kidneys are damaged. However, in the past five years we have used "Mersalyl" on occasion with safety, but not with a great deal of success. Perhaps we should use it more frequently.

It is unlikely that the pathological basis in all cases is the same, and therefore there may be the occasional case in which the renal tissue requires and responds to a mercurial stimulus.

The Delivery.

The question of delivery is a double one: (*a*) when? and (*b*) how?

When?

Most obstetricians are by nature conservative, and there are many obstetric bridges which we do not have to cross if we give Nature time. But when it comes to severe pre-eclampsia and severe hypertension one is justified in being a little more radical than one's general obstetric instinct would allow.

Most would agree that it is justifiable to end a pregnancy and risk the baby if in one's judgement one feels that eclampsia is imminent or that the level of the hypertension is so high that fœtal death through accidental hæmorrhage is a possibility. Fortunately with good pre-natal care the majority of patients can be carried to "thirty-six weeks" and a viable child. After this the question of "when" is not so difficult.

In preeclampsia, if the systolic blood pressure is over 160 millimetres of mercury and there is much albuminuria with the patient at rest in bed, you have a clear-cut case for delivery no matter what the stage of pregnancy. The risk to the mother of continuing is considerable, while it is doubtful if the baby grows appreciably in the uterus of such a patient.

In chronic hypertension, if the patient has developed albuminuria, delivery should be sought if "thirty-six weeks" have been reached. You have won a prize which you may lose if you try for a bigger one. The baby is safer and will grow better in the cot.

Where there is no albuminuria, however, one can risk carrying the woman further, to thirty-seven or thirty-eight weeks. I have risked this successfully in a few cases when the systolic blood pressure has been up to 180 millimetres of mercury.

If the condition is chronic nephritis and you have accomplished the notable feat of carrying the patient to "thirty-six weeks", it is wise to deliver her without a day's further delay. The risk of concealed accidental hæmorrhage in this type of case in the last four weeks is considerable, and it may be impossible to replace this baby should it be lost.

How? Induction or Cæsarean Section?

Generally speaking one would try induction of labour first. If the patient is a *primipara* with an "unripe" cervix, I would strip the membranes and follow this with five hypodermic injections of "Pitocin", each of three minims. In a *multipara*, or in a *primipara* with a "ripe" cervix, I would rupture the membranes. If labour is not definitely established within twenty-four hours I would perform a Cæsarean section.

I look at it this way. If your initial decision to interfere was justified, then the indication for delivery twenty-four hours later should be equally valid or more so. If a reasonable attempt at induction has failed, there is only one other way of terminating the pregnancy and relieving the toxæmia, and that is by Cæsarean section.

It may sound, on the face of it, anomalous to say that I practically never perform a Cæsarean section for eclampsia, though it is a more severe toxæmia than preeclampsia. The reason is that I have never had any difficulty in getting an "eclamptic" into labour—*primipara* or *multipara*. Some of them come into labour spontaneously; others, even *primiparæ*, have responded readily to stripping or rupture of the membranes. In eclampsia the neuromuscular mechanism is in such a highly sensitive state that the uterus responds to an inductive stimulus which would be quite inadequate in other cases. Of course, there is the particular case of preeclampsia or chronic hypertension in which sterility has existed for years or the woman is elderly (obstetrically speaking), or that in which a malpresentation or some special circumstance exists. In these particular cases one should consider Cæsarean section.

But a reminder: If you perform a Cæsarean section, let it be a "lower segment" operation and screen her prophylactically with penicillin and streptomycin so that you give her the best possible chance of having a strong scar. For if it has been a case of preeclampsia, it may not recur and the patient may have her subsequent baby vaginally.

B. T. MAYES,
Professor of Obstetrics, University of Sydney.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on May 15, 1952, in the Verco Theatre, Institute of Medical and Veterinary Science, Adelaide, the President, DR. R. L. THOROLD GRANT, in the chair.

Recent Advances in Radiotherapy.

DR. JOHN MAYO read a paper entitled "Recent Advances in Radiotherapy" (see page 329).

DR. B. S. HANSON, in opening the discussion, said that before hearing Dr. Mayo he had had the impression that advances in radiotherapy since Dr. Mayo had last spoken to the Branch on the subject nineteen years before (at which time also Dr. Hanson had opened the discussion) had been only those made possible by the instrument manufacturers and the physicists. But he (Dr. Hanson) now realized that in addition there were changes in the clinical approach which were of considerable practical importance. He had worked with and under the direction of Dr. Mayo for so long and studied his methods so carefully that his contribution to the discussion could be little more than "I agree". He said that if he might express slight criticism, it was that Dr. Mayo had not mentioned the fascinating recent work on the action of radiations on living cells, but no doubt that omission was dictated by lack of time. He would like to congratulate Dr. Mayo on compressing a large subject into such reasonable confines, and to thank him for providing a very interesting evening.

DR. L. L. DAVEY thanked Dr. Mayo for his stimulating address, and in referring to carcinoma of the *cervix uteri* mentioned Mr. Victor Bonney's good results from his extensive Wertheim operation with removal of pelvic lymphatic glands and also the equally good results of the Marie Curie Hospital's treatment of the same condition with radium. Dr. Davey said that his impressions formed on his recent trip abroad with regard to cancer generally were rather depressing, as successful treatment of the individual bad type did not seem to have advanced much in the last twenty years. In his opinion more emphasis would have to be placed on the type of cell and on whether it was radioresistant or radiosensitive before satisfactory results were likely to be obtained from this form of therapy in some clinics.

DR. R. M. GLYNN said that his experience with the treatment of carcinoma of the larynx by irradiation at the Royal Adelaide Hospital had been very disappointing. The results with surgery had been much more satisfactory than with irradiation. In fact over the last fifteen years only two patients had been cured by irradiation alone.

Dr. Mayo, in reply, said that he must first answer a question asked by the President about a patient with *myasthenia gravis* and a probable tumour who refused operation. He thought that there could be little doubt that irradiation would be both a justifiable and a wise procedure.

He had no personal experience of irradiation of the particular condition mentioned, but it was known that thymomata were usually quite radiosensitive and the work at Saint Bartholomew's Hospital strongly suggested that such treatment might be completely successful. He would be most interested to hear the result of such treatment.

Dr. Mayo went on to say that Dr. Glynn had expressed dissatisfaction with the results of radiotherapy in the treatment of carcinoma of the larynx in Adelaide, and had also asked why it was that Cade was in favour of telecurietherapy for that condition and Baclesse against it. Dr. Mayo was glad to reply to Dr. Glynn. If Dr. Glynn would consider what he (Dr. Mayo) had said he would remember that Dr. Mayo had particularly stated that he did not wish to stress unduly the importance of radiotherapy in that connexion. Nevertheless he would like to point out that most of the patients with carcinoma of the larynx referred to the clinic were those with advanced and inoperable conditions, and that in at least one case an unsuccessful attempt had been made to remove the larynx. In that case and in another advanced case after irradiation no growth was found at the primary site at autopsy, but very numerous secondary deposits were present in the lungs. If patients with carcinoma in early stages were sent for treatment, successful results did occur. Dr. Mayo thought that Cutler's plan of deciding the method of treatment after the administration of half the radiotherapeutic dose was well worth a trial.

With regard to the question about telecurietherapy Dr. Mayo said that he had used that form of treatment when working in England at the Middlesex Hospital some twenty years previously. He had been profoundly impressed by it then, and Lederman's results proved its efficacy. The disadvantage was that the dosage rate was slow, much slower than X rays at 200 kilovolts or supervoltage, and that was probably why Baclesse preferred the latter. Nevertheless, the evidence showed that radium beam therapy (telecurietherapy) was effective, and Cade had every justification in supporting its use.

Dr. Mayo went on to say that Dr. Davey had referred to the surgical treatment of carcinoma of the cervix, in particular to the work of Victor Bonney and his performance of the Wertheim operation, and also to the good work done at the Marie Curie Hospital in the irradiation treatment of this disease. Bonney's work was so well known that there was no need for him (Dr. Mayo) to make any comment, save perhaps to say that Bonney had assumed that his operability rate, which was 63% for his earlier series of cases, remained at the same figure for his later series. There was no doubt that Bonney was the outstanding exponent of the operation and his results were remarkably good. Dr. Mayo believed that Dr. Hurdon, who was in charge of the Marie Curie Hospital for many years, had worked for some twenty years with Howard Kelly. There was no doubt that under Dr. Hurdon's direction the hospital has done very good work, and though she was dead it continued to do so. The results of irradiation therapy in cases of carcinoma of the cervix as carried out at that institution were, Dr. Mayo believed, the best in England. The figures he had quoted in his paper had come from their records.

In conclusion, Dr. Mayo thanked the chairman, Dr. Hanson and the other speakers for their kindly remarks and criticisms.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney, Crow's Nest, New South Wales, on April 17, 1952. The meeting took the form of a series of clinical demonstrations by members of the medical and surgical staff of the hospital. Parts of this report appeared in the issues of August 2, 16, 23 and 30, 1952.

Histoplasmosis.

DR. J. BRITTEN DOWE presented a man, aged thirty-seven years, suffering from histoplasmosis. The history of the patient's present illness was that in January, 1950, he had noticed involuntary variations in the pitch of his voice, and since then his voice had become progressively weaker, so that now he could speak only in a whisper. Since August, 1951, he had been having paroxysms of coughing in the morning, with the production of creamy yellow sputum. In January, 1951, he had bitten his tongue, which had bled and become painful; later, a deep painless ulcer had formed. Investigation of his previous health and environment revealed that he had never been away from Sydney until he joined the army in 1942. He was stationed at Greta and Brisbane while in Australia and in the Fraser Islands in 1943. Later he was in Merauki and Hollandia (Dutch New Guinea), Lae, Nadzab, Aitape, Vokeo (Shouter Group), and Morotai. After three months in Borneo he returned to Brisbane where he was discharged from the army. He returned to Sydney in January, 1946. He had come into contact with people of all nationalities—English, French, Chinese, Eurasians, Thailanders and Filipinos. In Borneo he had eaten the flesh of water buffalo and zebra, and had handled pet monkeys. While in Morotai he had had an attack of fever which was undiagnosed, but since that time (for about six years) he had had frequent night sweats. He had also suffered from malaria and had had frequent boils since 1943. Examination of the patient revealed an undermined ulcer on the right edge of the tongue; it had a white base and was not painful. Inspection of the larynx revealed œdema of the false cords; shallow extensive ulceration was present on the left vocal cord, which was fixed. There were no other significant clinical findings. A Wassermann test, chest X-ray examination and examination of films for malaria parasites all yielded negative findings. A blood count revealed a hæmoglobin value of 15·2 grammes *per centum* and a total leucocyte count of 10,000 per cubic millimetre, of which 71% were neutrophile cells. Swabbings were taken from the larynx and tongue, and from them *Histoplasma capsulatum* was grown. The result of a histoplasmin skin test was positive. The patient was treated with "Atebrin" and sulphadiazine, with improvement in relation to the tongue ulcer, but no improvement in the voice.

Fibroma of the Ovary.

DR. STUART B. STUDDY presented a married woman, aged sixty-four years, who had been admitted to hospital in November, 1951, complaining of a bearing-down pain in the back, a feeling of fullness in the abdomen, and indigestion and breathlessness. She had no vaginal discharge or pain, but had experienced some loss of weight. The menopause had occurred fifteen years previously. Examination of the patient revealed a hard abdominal mass the size of a twenty-four weeks pregnancy to the right of the mid-line. Some free fluid was present, and the mass was mobile. On vaginal examination, the uterus was found to be separate from the mass, which was ballottable. Examination of the chest revealed no abnormality. At operation, a solid tumour of the left ovary was removed, which was found on pathological examination to be a fibroma with extensive areas of degeneration.

Multiple Pregnancy (Fœtus Papyraceus).

Dr. Studdy also presented a married woman, aged twenty-four years, who had been admitted to hospital on March 10, 1952, complaining of labour pains since the early morning, and of "something coming away". Her last menstrual period had been on July 9, 1951. Examination of the patient revealed a uterus of the size of a thirty-six weeks pregnancy. The baby had a vertex presentation and was in the left occipito-anterior position. The fœtal heart sounds were audible. A *fœtus papyraceus* was found in the vulva, attached by a thin, pale cord, which was cut and tied. Vague abdominal aching continued until March 13, when moderate pains began at 7.30 p.m. The fœtal heart sounds were inaudible. On March 14 the pains increased and the fœtal heart sounds were faintly heard. At 5 p.m. the cervix was fully dilated, and after the carrying out of pudendal block and perineorrhaphy, a baby was born by low forceps extraction. It weighed five pounds three ounces and was 19 inches long. Later the mother was readmitted to hospital with pain over the *symphysis pubis*, and X-ray examination revealed separation of the pubic bones.

Hiatus Hernia and Stricture of the Œsophagus.

DR. CLAIR ISBISTER, DR. PAULINE GASTON, DR. IAN BOOTH, DR. F. N. STREET and DR. A. OWEN presented three patients to illustrate the subject of hiatus hernia and stricture of the œsophagus. In a preliminary discussion, attention was drawn to the following main symptoms of those conditions: vomiting, which occurred from birth or soon after, was effortless and characterized by remissions, and was present in 100% of cases; hæmorrhage, which occurred in about 70% of cases and might be manifested by blood-streaked vomitus, hæmatemesis, the presence of occult blood in the stools or melæna; dysphagia, particularly for solids, and characterized by pronounced periodicity; loss of weight; failure to thrive; anæmia; pain. With regard to diagnosis, it was stated that all authorities stressed the importance of the clinical picture. Radiological investigation included barium bolus examinations, screening, and examination of the patient in the Trendelenburg position, most stress being placed on examination for reflux barium into the œsophagus.

particularly when there was massive reflux. Four stages of the condition were described. The first stage was that of sliding hernia, in which the gastric cardia might force its way into the chest, regurgitation of gastric contents producing œsophagitis and sometimes ulcer. The second stage was that of dilatation of the œsophagus, with no constriction at the level of the cardia; the hernia was funnel-shaped, and there might be massive regurgitation and ulceration. In the third stage there was shortening of the œsophagus with slight dilatation, constriction at the level of the cardia, mucosal folds showing in the hernia, and regurgitation into the œsophagus; the presence of massive reflux was pathognomonic. In the fourth stage there was a developed hernia, a short œsophagus, stricture, and dilatation of the œsophagus. With œsophagoscopic examination, stricture, ulceration and dilatation could be seen and biopsy was carried out. The conditions to be considered in differential diagnosis were underfeeding and overfeeding, pyloric stenosis, atresia of the œsophagus, duodenal stenosis and true short œsophagus.

The first of the three patients presented, who was aged four months, had vomited since birth, with remissions; hæmorrhage had occurred frequently. X-ray examination revealed reflux into the œsophagus, and on the first occasion on which the baby was tipped up, there was a massive return of barium. The second child, who was aged one year, had vomited since birth, with remissions and hæmorrhage, dysphagia and attacks of complete obstruction. X-ray examination showed stricture at the level of the fifth and sixth dorsal vertebræ. Dilatation of the œsophagus had made the stricture patent, but had not relieved the condition. The baby had congenital heart disease, and it was thought that the condition might be one of true short œsophagus. Operation seemed to offer the best possibility of a good result, but the child was at present thriving and the parents were not anxious to have an operation performed. The third child, a boy, aged two and three-quarter years, had suffered from vomiting since birth, dysphagia and the presence of occult blood in the stools. X-ray examination revealed dilatation of the œsophagus with stricture three inches above the diaphragm. Œsophagoscopic examination confirmed the presence of the stricture, which had been dilated once. The child was not progressing satisfactorily; he frequently suffered from complete obstruction and vomiting and was not gaining weight. He was to undergo further dilatation and open operation.

It was pointed out that certain authorities stated that conservative treatment offered little possibility of relief, whereas open operation with reduction of the hernia offered a chance of cure and should be performed early. It was considered worthy of note that the second and third patients presented had been examined by many doctors and had had several X-ray examinations before the diagnosis was made even of œsophageal abnormality. The comment was made that it might well be that the clinical picture was more reliable, and in the case of the first patient, whose radiological findings were still indefinite, open operation might be the best procedure to follow.

Cretinism.

The same group of doctors presented a baby, aged four months, suffering from cretinism. The history was that the baby had become very constipated and developed a distended abdomen, together with jaundice, six days after birth. An umbilical hernia was also very prominent. A barium enema examination to exclude Hirschsprung's disease yielded normal findings. The abdominal distension was always present, but varied in degree, as did the jaundice, which was thought probably to be due to mild umbilical infection. The mother's pregnancy and labour had been normal, and there was no ascertainable family history of cretinism or goitre. The baby was breast-fed and had gained weight well. Examination of the baby revealed pallor of the mucous membranes and slight skin jaundice. The tongue was large and protuberant, the nose somewhat broad and the bridge of the nose depressed. The abdomen was protuberant, with a large umbilical hernia. The child was very "snuffly" and had a peculiar hoarse cry. His eyelids were slightly swollen. He could not suck a bottle, probably because of the large tongue and "snuffles". The heart and lungs appeared to be normal. X-ray examination showed no ossification of the carpus and delayed development of the femoral epiphyses. The blood cholesterol level was 133 milligrammes *per centum*, which fell to 101 milligrammes *per centum* after about five weeks of thyroid medication. Blood examination revealed a total of 3,250,000 erythrocytes per cubic millimetre, and a hæmoglobin value of 9·8 grammes *per centum*. Wassermann and Eagle tests of the blood yielded negative findings. Treatment had been started on March 1, 1952, with desiccated thyroid, one-twenty-fourth of a grain three times a day. Within three weeks, spontaneous daily bowel movements had begun, the abdominal distension was gradually reduced, and the tongue decreased slightly in size. The dose of thyroid had been increased gradually up to one-half grain daily, given in divided doses with no observed ill effects. Ferrous sulphate, in a dosage of four and a half grains daily, was also being given in a mixture. After three weeks of treatment the baby was able to suck a bottle, previously having been tube-fed. The jaundice had disappeared, leaving an appearance of pronounced skin pallor.

In discussion it was pointed out that cretinism was seldom recognized at birth. The birth weight was usually within normal limits, and the children affected usually slept more than usual and cried little. The abdomen was large, and an umbilical hernia was present. Retardation of physical and mental development became more noticeable in the following months, and by the end of the first year the clinical picture was usually fully developed. The following features were usually present: stunting of growth, with large head and short extremities; widely separated eyes, a broad nose and a depressed bridge; swollen eyelids; an open mouth with a thick, broad, protruding tongue; delayed dentition; a short, thick neck; prominence of the abdomen and umbilical hernia; a dry, scaly, cold, and often yellowish skin; a slow pulse; disturbance of ossification, especially in the long bones, with increasing discrepancy between bony age and chronological age; a coarse, harsh voice; lethargy, delay in sitting and standing, and failure to learn to talk. If the thyroid tissue was not completely absent, the symptoms might be milder, the syndrome incomplete, and the onset delayed. In differential diagnosis the conditions to be considered were mongolism, chondrodystrophy and Hirschsprung's disease. With mongolism the signs were present at birth, but physical growth, pattern of ossification, skin and hair were normal, and there was rarely abdominal distension or severe constipation. With chondrodystrophy, the short extremities, large head and flattened bridge of the nose occurred, but the baby was usually bright and intelligent otherwise. Hirschsprung's disease could be differentiated by the findings of barium enema examination.

Enlargement of the Thymus.

Finally, the group showed three infants suffering from enlargement of the thymus. The first child, when examined in June, 1950, at the age of seven weeks, had suffered with cough and difficulty in breathing as well as extreme slowness in taking his artificial feeds. He was a pale child with crowing respiration and some suprasternal indrawing, but no chest recession. The blood count revealed a total of 3,980,000 erythrocytes per cubic millimetre, a hæmoglobin value of 12·4 grammes *per centum*, and a total leucocyte count of 16,300 per cubic millimetre, made up of neutrophile cells 16%, eosinophile cells 7%, lymphocytes 71% and monocytes 6%. Radiological examination of the chest in September, 1950, revealed enlargement of the upper mediastinal shadow and a suggestion in the lateral view of enlargement of the thymus. In March, 1951, the upper part of the mediastinum was still widened and the trachea deviated to the right. The lateral view showed that the lesion was situated anteriorly. No tracheal obstruction was evident, but the intrathoracic portion of the trachea had a slight posterior convexity. The appearance was that of a space-occupying lesion in the upper anterior part of the mediastinum, slightly larger than that seen at the previous examination. It was thought that it was probably due to the thymus. The child progressed satisfactorily, gained weight, and took early mixed feeding, though the stridor persisted and there was apparently some difficulty in swallowing. Irradiation was not recommended, as the mother was not keen on it and the child's anæmia did not respond rapidly to iron therapy. At the time of the meeting he was two years old and had stridor only at night after he had been over-tired.

The second child, a premature baby, had had several cyanotic attacks while in hospital soon after birth. Progress was satisfactory to the age of four months, when he developed a wheezing cough, worse at night, which persisted for several months. X-ray examination of the chest showed slight deviation of the trachea to the right, possibly the result of an opacity in the upper part of the mediastinum thought to be thymic tissue. About a year later the thymus was still visible radiologically, but the child was free of symptoms.

The third child, when examined at the age of five months, had had a history of noisy breathing since birth, breathlessness during feeding and on exertion, and a recent cough.

He was a pale child with noisy respiration, partly stridor and partly snore. His tonsils were enlarged, and adenoid tissue was palpable. A pronounced Harrison's sulcus was present, but no chest recession. The sounds from the upper part of the respiratory tract made examination of the heart and lungs unsatisfactory. The hæmoglobin value was 10·2 grammes *per centum*. Chest X-ray examination showed some enlargement of the upper mediastinal shadow, probably due to enlargement of the thymus. The respiratory effects persisted, and the child had recurrent colds. Six months later he was very pale, and because of a family history of tuberculosis, a Mantoux test was carried out; the result was negative. A blood count revealed a total of 4,080,000 erythrocytes per cubic millimetre and a hæmoglobin value of 10·6 grammes *per centum*. The leucocytes numbered 5200 per cubic millimetre, being made up of neutrophile cells 15%, eosinophile cells 4%, lymphocytes 53% and monocytes 23%; occasional lymphoblasts were seen. Radiological examination revealed displacement of the trachea to the right at the level of the *manubrium sterni*. There appeared to be a mass in the upper part of the mediastinum, which might be enlarged thymus, but other tumours could not be excluded.

It was pointed out in discussion that clinically, enlargement of the thymus might present in one of three ways, as stridor, as thymic asthma or as syncope. Stridor usually occurred in young infants, who produced a soft, continuous, almost purring noise with exacerbations from time to time. In some cases it was louder, and if it was persistent a deformity of the chest would develop. Careful X-ray examination showed a shadow in the upper part of the mediastinum, and a lateral view would demonstrate pressure on the trachea; diagnosis should not be made without X-ray examination. Radiotherapy would reduce the size of the shadow and would sometimes, but not always, decrease the stridor which more commonly passed off slowly. Often, with an underlying accompaniment of a mild degree of stridor associated with the X-ray appearances just described, there occurred urgent attacks of dyspnœa and cyanosis, which had been termed "thymic asthma". It was probable that the condition was just an exaggerated version of the stridor type, although it had been suggested that it was due to pressure on the vagal nerves. The attack might be prolonged and end in a form of collapse, with the child pale, grey, shocked and sweating. It was possible that the last-mentioned condition was a borderline state between the second type and the third, which was that of syncope and was manifested by sudden collapse and pallor, very like *petit mal*. Occasionally a baby was found in its cot collapsed and pulseless, with slight twitching, and recovered after warmth and stimulants had been supplied. Such infants were often undersized, and careful X-ray examination would show an upper mediastinal shadow. Such an infant might pass the borderline between severe syncope and sudden death. Radiotherapy brought about a prompt cessation of symptoms.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held on Friday, July 4, 1952, in the Anatomy Theatre, New Medical School, Frome Road, Adelaide.

The Laboratory of Professor H. A. Krebs, F.R.S.

DR. P. M. NOSSAL outlined briefly the fundamental contributions of Professor H. A. Krebs to biochemistry, namely, the Krebs tricarboxylic acid cycle, which had proved to be of even more fundamental importance than Krebs himself had thought, the ornithine cycle for urea production and the many enzymatic methods for estimating important biological intermediaries. He said that Krebs's present work included the problem of acetate oxidation in yeast, the measurement of P/O ratios in the oxidations of the Krebs cycle, the rate of potassium turnover in brain and retina, the measurement of redox potentials in CoI and CoII, the $\triangle$ F of adenosine triphosphate and the problem of antiketogenesis. Associated with Krebs in a very small but crowded department were Dr. R. E. Davies and Mr. Kornberg, working on the mechanism of hydrochloric acid secretion and the role of carbonic anhydrase therein. In that section the metabolic fate of urea and bicarbonate was being studied by means of isotopes. Dr. J. S. D. Bacon and Dr. J. Edelman had elucidated a phenomenon called transfructosidation. That showed that carbohydrases during the processes of hydrolysis also synthesized higher polysaccharides. Mr. D. E. Hughes, in the microbiological laboratory, was mainly concerned with the synthesis and breakdown of CoI. Dr. L. E. Hokin had been the first to demonstrate the in-vitro synthesis of an enzyme (amylase in pigeon pancreas slices). He had just published a new theory concerning the role of ribonucleic acid in the movement and organization of cytoplasmic protein. Dr. Nossal himself had been concerned with the metabolism of dicarboxylic acids in yeasts, had elaborated a new method for the estimation of malic and fumaric acids, and had studied the metabolism of pyruvate in *Lactobacillus arabinosus*.

Genetics of Cellular Metabolism.

PROFESSOR D. G. CATCHESIDE gave an account of the relation between genes and the characters they determined, considering especially the inherited defects in intermediary metabolism that might be studied in the mould *Neurospora*. He said that the subject of physiological genetics had commenced with Garrod's study of alcaptonuria in man and the discovery that alcaptonurics lacked the enzyme which, in normal individuals, oxidized homogentisic acid. The hypothesis that each gene in a normal individual controlled a particular step in metabolism through control of an enzyme concerned in it had so far not encountered a clear exception. In several cases a particular enzyme was missing in a mutant, and in others there was evidence of enzymes partially altered in their physical properties.

Metabolic reactions might be investigated by means of genetic blocks, and were found to include chain, condensation and competitive reactions. Frequently a genetic block resulted in the accumulation of precursors to levels above those in the normal organisms, and those might produce other compounds through shunt reactions. Secondarily, they might cause derangements of other metabolic reactions. By genetic methods, two or more metabolic defects might be combined in the same organism, and those often showed unexpected interactions disclosed by peculiarities in the physiology of the organism.

The genes controlling different steps in a biosynthesis usually appeared to be randomly distributed in the chromosomes. That was true even of the three or four genes concerned in one apparent step, such as the methylation of homocysteine to form methionine. In a few cases, for example, a "step" in nicotinic acid synthesis, several genes were extremely closely linked. Possibly, where metabolic intermediates were unstable, the controlling genes must be closely linked to ensure proximity of the enzymes they controlled.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

FROM ALEXR. McLEAY TO THE SUPERINTENDENT OF HOSPITALS.[1]

Colonial Secretary's Office,
23 September, 1831.

James Bowman, Esq.,
Superintendent of Hospitals.

Sir,

In transmitting to you the accompanying copies of a correspondence between Mr. Surgeon Brooks & the Commissariat officer at Newcastle, I am directed by the Governor to request that you will enjoin that Gentleman to be careful that no impediment is offered to the Public Service by the irritability of his temper, and to add His Excellency's regret that it should have been necessary to convey such an injunction, at the very time that I am replying to Mr. Brooks' claim for protection against the irritability of another.

I have, &c.,
ALEXR. McLEAY.

[1] From the original in the Mitchell Library, Sydney.

Special Correspondence.

NEW ZEALAND LETTER.

FROM OUR SPECIAL CORRESPONDENT.

Appointment to Chair of Surgery, University of Otago.

To succeed Professor F. Gordon Bell, who has occupied the chair of surgery at the University of Otago since 1925 and who is to retire at the end of 1952, Mr. M. F. A. Woodruff, at present assistant surgeon to Aberdeen Royal Infirmary and the Royal Aberdeen Hospital for Sick Children, has been appointed by the Council of the University of Otago.

Mr. Woodruff, who is forty-one years of age, graduated at the University of Melbourne, where his father occupied the chair of bacteriology, first in electrical engineering and then in medicine in 1937. After appointments at the Royal Melbourne Hospital, Queen's College, and the University, he graduated M.D. in 1940 and M.S. in 1941. As a captain in the Australian Army Medical Corps he served in Malaya and was taken prisoner in February, 1942. During this period he studied deficiency diseases and his report has recently been published by the Medical Research Council in London.

In 1946 he joined the surgical professorial unit in Sheffield. In 1948, after a travel tour in the United States of America and Canada under a World Health Organization travelling fellowship, he went to Aberdeen to his present appointment. He has also been senior lecturer in surgery to the University of Aberdeen. He is an associate examiner in surgery to the University of London, and in 1951 was a Hunterian Professor of the Royal College of Surgeons of England.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, promotions *et cetera* are promulgated in the *Commonwealth of Australia Gazette*, Number 55, of August 14, 1952.

AUSTRALIAN MILITARY FORCES.

Royal Australian Army Medical Corps (Medical).

VX700282 Honorary Captain J. H. Leyden is appointed from the Reserve of Officers, and to be Captain (provisionally), 3rd May, 1952.

The following officers relinquish the provisional rank of Captain and are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (1st Military District) in the honorary rank of Captain, 6th May, 1952: QX700154 B. H. Gutteridge and QX700155 J. F. O'Duffy.

The following officers relinquish the provisional rank of Captain and are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (2nd Military District) in the honorary rank of Captain: NX700358 D. D. Arnold, 7th May, 1952, and NX700359 J. G. Wells, 30th April, 1952.

The following officers relinquish the provisional rank of Captain and are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (3rd Military District) in the honorary rank of Captain: VX700273 F. I. Bishop and VX700272 J. G. H. Refshauge, 2nd May, 1952. VX700274 P. Kirby, 6th May, 1952, and VX700281 J. S. Penington, 3rd June, 1952.

To be Captains (provisionally).—VX700280 Graham Arthur Rutherford and VX700281 John Stewart Penington, 30th April, 1952, NX700360 Barrie Pedder Scrivener, 28th April, 1952, NX700361 John Bevan Dillane, 5th May, 1952, NX700362 Francis Joseph Buchhorn, 9th May, 1952, NX700363 Maurice Pozniak, 13th May, 1952, and NX700364 Richard Alan Bruce Vance, 19th May, 1952.

Australian Regular Army.

Royal Australian Army Medical Corps (Medical).

To be Captain, 2nd July, 1952, with a Short Service Commission for a period of four years.—2/40131 Henry Gayst (Captain).

Citizen Military Forces.

Northern Command: First Military District.

Royal Australian Army Medical Corps (Medical).—1/61767 Lieutenant-Colonel K. J. J. Dorney, D.S.O., is appointed from the Reserve of Officers, and is appointed to command 9th Field Ambulance, 1st February, 1952. The following officers are appointed from the Reserve of Officers, and to be Captains (provisionally), 4th March, 1952: Honorary Captains 1/39130 P. J. F. Grant, 1/39131 B. S. Purssey, 1/39132 I. S. Holle and 1/39133 C. L. Cilento.

Eastern Command: Second Military District.

Royal Australian Army Medical Corps (Medical).—2/127805 Captain (provisionally) A. Proust relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (2nd Military District) in the honorary rank of Captain, 9th May, 1952. To be Captain (provisionally), 11th June, 1952: 2/127881 Richard Banks Geeves.

Southern Command: Third Military District.

Royal Australian Army Medical Corps (Medical).—3/50151 Honorary Captain J. H. Lindell is appointed from the Reserve of Officers, and to be Captain and Temporary Major, 11th June, 1952.

Western Command: Fifth Military District.

Royal Australian Army Medical Corps (Medical): To be Captains (provisionally).—5/32256 Thomas Peter Banting and 5/44300 Peter Dean Breidahl, 18th March, 1952, and 5/26514 Robert Paton, 16th June, 1952.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps (Medical).

3rd Military District.—The resignation of Honorary Captain T. F. Spring of his commission is accepted, 13th May, 1952.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force.

Medical Branch.

The following are appointed to short-service commissions, on probation for a period of twelve months, with the rank of Flight Lieutenant: Henry Stephen Trinder (025593), 10th June, 1952, Lionel Keith Rasmussen (025614), 13th June, 1952, Flight Lieutenant W. E. Downey (036102), on transfer from the Reserve, 18th June, 1952, Heino Borkan (025627), Gerald Sidney Radford (025626), 19th June, 1952, Donald Campbell Galbraith (025651), 30th June, 1952.

The resignation of the following officers is accepted: Squadron Leader J. N. Diggle (033066), 30th May, 1952, P. M. Davies (023028), 10th June, 1952.

Obituary.

O'DONEL BROWNE.

DR. GEOFFERY E. PETERS has sent the following appreciation of the late Dr. O'Donel Browne.

The untimely death of O'Donel Browne, Master of the Rotunda Hospital, on July 24, 1952, at the Rotunda Hospital, at the early age of forty-nine years, must cause widespread grief in the obstetric world and amongst those who had had the privilege of knowing this great man. His death could not be said to have been entirely unexpected, in that he had suffered a left coronary thrombosis in late April of this year and was at the time of his death convalescing from this attack. However, his progress had been sufficiently good for him to get around the hospital for short periods, and the writer had the pleasure of greeting him some ten days before his death at the Irish Lawn Tennis Championships, whither he had come to watch Maureen Connolly play—he had been a keen tennis player in his younger days.

Browne had been Master of the Rotunda since November, 1947, thus having some two and a half years of his term to run, and he was one of its greatest masters. His placid temperament (one would never have thought him likely to suffer from coronary disease, with a temperament like his) and his unfailing courtesy to everybody on the staff, from

the assistant masters down to the meanest menial, earned him the love and regard of all; his absolute sense of fairness (blame was his when he made the mistake and was not shifted to some lesser mortal), his widespread knowledge of obstetrics and gynæcology, and his devotion to work all contributed towards his popularity amongst those who came into association with him. I had the privilege of working under him as a post-graduate and staff member during 1950 and 1951, and I can say honestly that I have never met a more perfect gentleman, in every sense of the word. "O.D.B." or "The Boss", as he was usually termed among the staff, had all those qualities which go towards the making of the nearly perfect man and master.

His work as master, especially during the last few years, may have been partly responsible for his early death, for he was an indefatigable worker and was deeply interested in the toxæmias of pregnancy in a general sense and especially in accidental hæmorrhage. He had instituted changes in the antenatal section of the hospital work, designed to eliminate so far as was humanly possible any chance of symptoms being missed which might help one to prevent toxæmia developing, or, if it had developed, to prevent the occurrence of supervening eclampsia. He held that the signs of toxæmia commonly found after hæmorrhage of the accidental variety were not as often due to toxæmia as some people have supposed, but that the shock of the initial hæmorrhage, consequent on the placental damage and partial separation thereof, was causative. He was convinced that mothers and babies could be saved by the giving of blood early and by the performance of Cæsarean section if the condition was not improving, or if labour either had not started or, if begun, was not continuing satisfactorily. He had established a system of records which over the coming years will give a most useful amount of valuable information to future workers in the Rotunda.

O'Donel Browne was King's Professor of Midwifery at Trinity College, University of Dublin, of which he himself was one of its most brilliant graduates. He was a Fellow of the Royal College of Physicians in Ireland and of the Royal College of Obstetricians and Gynæcologists, of which latter body he was a member of the Council, representing Ireland, and also examiner for the membership and diploma examinations of that body. Apart from these activities he was a writer of note and was a Doctor of Literature of Trinity College and had written extensively of the history of the Rotunda Hospital. He was a most gifted speaker, and apart from the clear and forceful explanation of his subject matter, it was sheer pleasure to sit and listen to his complete mastery of the English tongue—he was never extravagant in his use of words, and what he used was perfect English.

He was born on April 10, 1903, and was himself the son of a doctor. He had been a student, post-graduate student, staff member and assistant master of the Rotunda before coming to it as master. He married Lorna, daughter of Hastings Tweedy, an ex-master in the early days of this century, so he brought plenty of obstetric flavour to the hospital on his appointment. He was an exceedingly normal individual—he was very even tempered, placid and completely free of moods, but nevertheless he was exceedingly ambitious concerning the work of his own mastership and of those under him, so that the results should be of value long after the Great Reaper had passed by. The world will now be deprived forever of what would have emanated undoubtedly from his great intellect during the next five or ten years—a period which would have produced the fruits of all his work both day and night, for although we all thought that O'Donel Browne left hospital things, barring emergencies, to themselves when he had completed his evening round, we know now that he worked far into the night at things still connected with obstetrics.

English-speaking folk hate to express their regard for a person in what might be construed as extravagant terms, but it would be impossible to say other than that O'Donel Browne was genuinely loved by his staff. It was impossible to work with him for long without feeling an unable-to-be-repressed affection for his friendliness, fairness, considerateness, and above all his humility. For the majority of us who have been associated with him, it will take a long time to realize that this great man is no longer with us, for he was a sincere friend as well as a teacher. A simple service was conducted in the hospital chapel on Saturday, July 26, by His Grace the Lord Archbishop of Dublin (Dr. Barton), the Dean (Dr. de Paulley) and the Succentor (the Reverend R. C. Armstrong) of Saint Patrick's Cathedral, and the Reverend Canon Emerson, Rector of Saint Mary's. It was

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED AUGUST 9, 1952.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	..	..	..	2	..	..	..	2
Amœbiasis	..	1	..	..	..	..	..	..	1
Ancylostomiasis	..	..	..	..	..	..	..	..	..
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	..	..	5(5)	..	..	1	4	..	10
Diphtheria	1(1)	6(5)	4(2)	2(1)	2(2)	..	..	..	15
Dysentery (Bacillary)	..	1(1)	3(2)	58(53)	..	..	..	..	62
Encephalitis	..	..	1	..	..	..	..	..	1
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	2	..	..	..	..	..	..	2
Infective Hepatitis	..	..	..	..	10(7)	..	1	..	11
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	1	..	..	..	..	..	1
Malaria	..	..	..	..	3	..	..	..	3
Meningococcal Infection	8(7)	5(3)	2(1)	2	..	..	..	..	17
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	6(2)	1(1)	14(5)	1(1)	..	..	..	22
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	20(16)	..	..	3(1)	..	..	..	23
Salmonella Infection	..	..	..	..	1	..	..	..	1
Scarlet Fever	19(13)	20(14)	8(8)	6(3)	4(3)	7	..	..	64
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	33(22)	46(39)	6(3)	5(3)	8(3)	6(5)	1	..	105
Typhoid Fever	..	..	..	..	1(1)	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	1	..	1(1)	..	..	..	2
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

attended by Catholic and Protestant alike, all present joining in a common desire to pay a last homage to him whom we loved so much. Immediately after the service the funeral left for Naas, where D'Donel Browne now lies with his father.

The sympathy of the entire obstetric world must go out to Mrs. O'Donel Browne, to his son and daughter, both medical students at Trinity College, and to his widowed mother, in the irreparable loss of this great and lovable man.

GILBERT ELLIOT AITKEN.

We have received from Dr. H. M. Birch the following appreciation of the late Dr. Gilbert Elliot Aitken.

Dr. Gilbert Elliot Aitken died on June 22, 1952, after having lived a full active life of nearly three score and ten years in many parts of the world.

Gilbert Aitken was born in Inverness, Scotland, the son of Thomas Aitken, M.D., and after studying at the Inverness Royal Academy and at the Universities of Edinburgh and Glasgow, he qualified in 1907. During World War I Dr. Aitken served with the Royal Naval Transport Service, and such was his love for the sea that he subsequently took a number of posts as ship's surgeon. Later he was medical officer of the Duntroon Military College, and after this he took up a psychiatric appointment at Parramatta Mental Hospital. Dr. Aitken held several other psychiatric posts in Goodna and in New Norfolk, and finally came to Parkside Mental Hospital as deputy superintendent in 1935. There he remained until his retirement in 1949.

During the years I had the honour to work with Dr. Aitken he always showed the outstanding qualities of a highland gentleman, which endeared him to his patients and his colleagues alike.

His son, Dr. Gilbert Aitken, is the medical superintendent at the Queen Victoria Maternity Hospital, near Adelaide.

JAMES EDWARD EVERARD.

We regret to announce the death of Dr. James Edward Everard, which occurred on August 19, 1952, at Adelaide.

THOMAS GORDON ROSS.

We regret to announce the death of Dr. Thomas Gordon Ross, which occurred on August 23, 1952, at Sydney.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE, IN THE UNIVERSITY OF SYDNEY.

WEEK-END COURSE AT ALBURY.

The Post-Graduate Committee in Medicine in the University of Sydney, in conjunction with the Border Medical Association, will hold a week-end course at the Albury District Hospital, Albury, on Saturday and Sunday, September 13 and 14, 1952.

Programme.

Saturday, September 13.

2 p.m.: Registration.

2.30 p.m.: "Low Backache and Sciatica", Dr. Neville H. Morgan.

4 p.m.: "Management of Pulmonary Tuberculosis in Rural Practice", Dr. Maurice R. Joseph.

Sunday, September 14.

9.30 a.m.: "Recent Advances in Cardiac Disease", Dr. Maurice R. Joseph.

11 a.m.: "Preeclampsia and Toxæmias of Pregnancy", Dr. Robert Mackey.

2.30 p.m.: "Orthopædic Problems", Dr. Neville H. Morgan.

4 p.m.: Question time on obstetrical problems, Dr. Robert Mackey.

The fee for the course will be £3 3s. Those wishing to attend are requested to notify Dr. H. M. Webber, Honorary Secretary, Border Medical Association, 543 Kiewa Street, Albury.

Diary for the Month.

SEPT. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 12.—Queensland Branch, B.M.A.: Council Meeting.
SEPT. 15.—Victorian Branch, B.M.A.: Finance Subcommittee.
SEPT. 16.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 17.—Western Australian Branch, B.M.A.: General Meeting.
SEPT. 18.—Victorian Branch, B.M.A.: Executive Committee.
SEPT. 18.—New South Wales Branch, B.M.A.: Clinical Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital: all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 *per annum* within Australia and the British Commonwealth of Nations, and £6 10s. *per annum* within America and foreign countries, payable in advance.